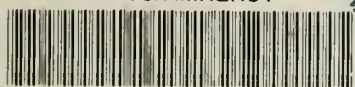


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Behavioral Risk Factors and Preventive Health Measures

Massachusetts Behavioral Risk Factor Surveys 1986-90

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June 1992

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF HEALTH AND HUMAN SERVICES
DEPARTMENT OF PUBLIC HEALTH

Behavioral risk factors and preventive health measures

The Massachusetts Behavioral Risk Factor Surveys, 1986-90

Aryeh D. Stein

Chronic Disease Surveillance Program
Division of Research and Epidemiology
Bureau of Health Statistics, Research and Evaluation

William F. Weld, Governor
David F. Forsberg, Secretary, Executive Office of Health and Human Services
David H. Mulligan, Commissioner, Department of Public Health
Daniel J. Friedman, Ph.D., Assistant Commissioner

Massachusetts Department of Public Health
150 Tremont Street
Boston, MA 02111

June 1992

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Additional information concerning the Behavioral Risk Factor Surveillance System, and copies of this report may be obtained from:

Ruth I. Lederman
Chronic Disease Surveillance Program
Bureau of Health Statistics, Research, and Evaluation
Department of Public Health
150 Tremont Street, 8th Floor
Boston, MA 02111

Tel: (617) 727-2735

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Executive summary

Rationale	Personal behavior, such as smoking, alcohol consumption and exercise, is a major risk factor for common chronic diseases, particularly heart disease and cancer. Identification of population groups at increased risk makes it possible to target interventions to these groups. The Behavioral Risk Factor Surveillance System, developed by the Centers for Disease Control, is an inexpensive method of obtaining prevalence estimates of several lifestyle characteristics among the population of Massachusetts.
Methods	A sample (n = 6,450) of Massachusetts residents was interviewed by telephone during 1986-90, using a standardized questionnaire developed by the Centers for Disease Control. Prevalence estimates were adjusted to reflect the age, sex and racial/ethnic composition of the Commonwealth. Trends over time and prevalence by eight demographic characteristics are presented for each behavioral risk factor and compared to national health objectives and prevalence.
Results	<p>Selected trends in prevalence for the Commonwealth as a whole include:</p> <ul style="list-style-type: none">● Reported seat belt use declined following repeal of the mandatory seat belt law in November 1986, but has started to increase in recent years. In 1990, 53% of Massachusetts residents reported using seat belts all or most of the time.● The prevalence of overweight, based on self-reported height and weight, was 20% in 1990 and has not changed since 1986.● The proportion of women reporting regular aerobic exercise has increased every year since 1987, although prevalence was low (10% in 1990, up from 6% in 1987). Among men the proportion was unchanged (11%) over the years of the survey.● Self-reported smoking prevalence declined from 28% in 1986 to 23% in 1990.● The proportion of residents who reported drinking 60 or more alcoholic drinks per month dropped from 10% in 1986 to 5% in 1990.

- The proportion of residents who reported **driving after consuming too much alcohol** at least once in the past month declined from 6% to 3%.
- The prevalence of reported **hypertension** declined from 19% to 14%, although the trend was not consistent over time.
- The proportion of residents who reported **ever having their cholesterol checked** increased from 46% in 1987 to 65% in 1990. This represents a 50% increase from 1987 levels.
- The proportion of **people who have been screened who have been told their cholesterol level is high** increased from 15% in 1986 to 27% in 1990. This suggests that screening programs are increasingly successful at reaching higher-risk individuals.
- The proportion of **women 40 years of age and over who have ever had screening mammography** increased from 52% in 1987 to 78% in 1990.
- The proportion of **women 50 years of age and over who reported receiving a mammogram within the past two years** increased from 50% in 1987 to 68% in 1990.

Table 1 highlights those sectors of the Massachusetts population that have elevated risk of chronic disease due to increased prevalence of behavioral risk factors. Table 2 compares the prevalence of selected risk factors in Massachusetts to the median prevalence in states participating in the BRFSS in 1990.

Comment

Massachusetts residents are modifying their lifestyles. Most risk factors analyzed showed an increase in the prevalence of individuals reporting a healthier lifestyle, which should lead to widespread improvements in health. Other risk factors, however, do not appear to have changed in prevalence.

For most risk factors the population of Massachusetts has not yet achieved the goals for the Year 2000. In addition, several sectors of the population, particularly younger adults (below age 35), persons with less than high school education, persons with household incomes below \$15,000, and persons of African-American descent, have adverse risk factor profiles, indicating that they have not been successfully reached by current health promotion activities. New approaches to health promotion among these populations may be required.

The BRFSS is a useful tool for monitoring behavior trends in the population. The survey is ongoing and will continue to monitor progress towards the Year 2000 health objectives. In addition, the BRFSS is well suited to evaluate the impact of health interventions that target wide sectors of the Commonwealth population.

Table 1. Demographic characteristics of population groups with behavioral risk factors and adverse health profiles

Demographic characteristic	No regular seat belt use	Current cigarette smokers	Current cigarette smokers who have not tried to quit in the past year	Drank 5 or more alcoholic drinks on at least one occasion in past month	Drank 60 or more alcoholic drinks in past month	Drove vehicle after consumption of alcohol in past month
Men						
Women						
Younger adults (18-34)			(women)			
Older adults (55+)						
Blacks		(men)			(men)	
Hispanics				(men)		
Asians	(men)					
Less than high school education						
Annual household income less than \$15,000						
Unemployed						
Students						
Retired						
Widowed						
Divorced or separated						
Never married						

Table 1 (continued).

Demographic characteristic	Obese	No physical activity	Never had cholesterol checked	Diagnosed diabetic	Diagnosed hypertensive	Never had mammogram (women 40+)
Men						
Women						
Younger adults (18-34)						
Older adults (55+)						
Blacks	(women)		(men)	(men)		
Hispanics	(women)					
Asians		(women)	(women)			
Less than high school education				(women)	(women)	
Annual household income less than \$15,000	(women)				(women)	
Unemployed		(women)				
Students						
Retired						
Widowed	(women)			(women)	(women)	
Divorced or separated		(women)				
Never married						

Definitions of variables have been adapted to highlight adverse risk profiles. Shading denotes substantially increased risk. Unless specified, risk is increased for both men and women

Table 2. Comparison of the prevalence of selected behavioral risk factors and preventive health measures between the United States and Massachusetts, BRFSS 1990

	National prevalence*	Massachusetts prevalence
	%	%
Does not use seat belt regularly	26	47
Current cigarette smoker	23	23
Drank 5 or more alcoholic drinks at one occasion in past month	15	19
Drank 60 or more alcoholic drinks in past month	3	5
Drove vehicle after consumption of alcohol in past month	3	3
Overweight	23	19
Irregular or no physical activity**	58	50
Never had cholesterol checked	38	35
Hypertensive	16	14
Never had mammogram (women 40 and over)	32	22
Did not have recent mammogram (women 50 and over)	42	32

* National prevalence is the median prevalence among the 45 states and territories that participated in the Behavioral Risk Factor Surveillance System in 1990.

** This is not the same definition as presented in the body of the report. It includes individuals who reported no physical activity and those who reported less than three episodes of physical activity per week.

Introduction

In the early years of this century a large proportion of deaths (27% of Massachusetts deaths in 1900) were caused by infectious diseases. Poverty, undernutrition, and lack of clean water were major contributors to the high mortality rates from diseases such as cholera and diphtheria. Widespread improvements in housing, sanitation and nutrition and development of antibiotics and vaccines led to dramatic declines in incidence and mortality rates from these diseases, while the so-called "degenerative diseases", particularly heart disease and cancer, became more prevalent. At present these two diseases account for 6 of every 10 deaths in Massachusetts. It gradually became apparent that concurrent lifestyle changes were responsible for a major part of this new epidemic of chronic disease. Many studies, including the classic Framingham Heart Disease Study, (in which the population of the town of Framingham has been studied continuously since 1949), identified behavior such as sedentary lifestyle, cigarette smoking, and an increase in dietary fat intake, as significant causes of morbidity and mortality. The development of chronic disease is not simply a fact of growing old, but can be postponed or possibly even prevented by appropriate lifestyle behavior. Screening programs for early disease detection are also valuable in reducing morbidity, mortality and the economic burden of chronic disease by identifying individuals who need intervention, often before any symptoms become apparent.

While personal lifestyle and behavior patterns affect individual risk, it is not possible to identify individuals who will definitely experience a specific disease. Society as a whole reaps major measurable benefits from screening and risk reduction, in the reduced need for provision of medical and rehabilitative services, and the reduction in loss of economically productive life. The links between individual behavior and quality of life on one hand and the health of society as a whole on the other encourage public health advocates to develop interventions that reduce personal risk of premature death or disability.

The potential benefits to society from behavioral changes of individuals depend on three components: the relative risk of disease in a person with the risk factor compared to someone in whom the risk factor is absent; the prevalence of the risk factor in the community; and the incidence of the disease. While the first defines the potential benefit for the individual with the risk factor and therefore the perceived personal gain from behavior modification, the combination of the three determines the population attributable risk, which is the reduction in disease incidence in the community that would result from elimination or reduction of that risk factor. Health education and promotion activities have the highest potential impact on overall health status when they are targeted at populations or large sub-populations among whom a modifiable but potent risk factor is widely prevalent.

In recognition of the potential for improvements in personal health through behavioral and lifestyle changes as well as through improvements in preventive and curative clinical services, and in recognition of the World Health Organization's "Health for All by the Year 2000" campaign, in 1990, the Public Health Service issued the document "Healthy People 2000: National Health Promotion and Disease Prevention Objectives."¹ This document highlights levels and trends in the leading causes of death and disability in the United States and sets a series of health goals. Detailed baseline data are not available to evaluate progress towards many of these targets because data from defined, representative populations are not routinely collected.

The Behavioral Risk Factor Surveillance System (BRFSS) was developed by the Centers for Disease Control (CDC) to fill some of these data needs.² The BRFSS is a tool for evaluating trends in behavior across states and over time for the nation as a whole. The Survey was initiated in 1982 as a series of point-in-time surveys in 12 states. By 1984, the number of participating states had increased to 34, and the design had been changed to one of continuous sampling throughout the year. The BRFSS is funded by the Centers for Disease Control. Massachusetts joined the BRFSS system in 1986 and has participated every year since then. In 1990, 44 states and the District of Columbia participated in the BRFSS. The BRFSS is not designed to determine causes of disease and disability, but to establish the prevalence of risk factors for chronic diseases within the general population and among specified subgroups. In its current format it represents a cost-effective method for obtaining prevalence estimates for many lifestyle risk factors in the general population. In addition, it allows data from Massachusetts to be compared to estimates derived using identical methodologies in other states.

This report presents the results of the Massachusetts Behavioral Risk Factor Surveillance System surveys for the years 1986 through 1990. It is expected that these data will be used by Department of Public Health program planners and project directors to establish baselines for developing and monitoring progress in health promotion activities. Future reports from this surveillance system will continue to track progress towards the Year 2000 objectives.

¹U.S. Department of Health and Human Services, Public Health Service. Healthy People 2000: National Health Promotion and Disease Prevention Objectives. DHHS Publication No. (PHS) 91-50212. Washington DC: US Government Printing Office, 1990. Hereafter referred to as "Healthy People 2000."

²Remington PL, Smith MY, Williamson DF, et al. Design, characteristics and usefulness of state-based behavioral risk factor surveillance: 1981-86. Pub Health Rep 1988;103:366-375.

Study design

Questionnaire

The survey instrument used by the BRFSS is a questionnaire consisting of a series of modules, each of which contains one or more standardized questions pertaining to a specific behavior, designed to be administered by telephone. There is a core questionnaire which participating states are required to use. There is also a series of optional modules from which states may select those they wish to administer. The core questions and selected optional modules must be administered in standardized fashion to allow comparability across states. The questions used in each module have, in most instances, been derived from other survey instruments, most commonly the National Health Interview Survey and the National Health and Nutrition Examination Surveys. Many of the modules have remained constant over the years, although some individual questions have been revised. Individual states may also add locally-developed modules or questions to address local public health concerns. The module format, which is revised yearly, makes the survey flexible and responsive to emerging public health concerns. The survey instrument permits the analysis of trends both within groups of people over time and across groups at a point in time.

In general, Massachusetts has only administered the core questionnaire, although a dietary fat module was administered in 1990 and a fruits and vegetables module was administered in 1991. In 1992, a health status module and an environmental tobacco smoke module are being administered. Appendix Table I lists the core and supplementary modules administered in Massachusetts during the years 1986 through 1990.

Data collection

Data were collected under contract by Bell Associates, Cambridge MA, from 1986 through 1988, and by Wisconsin Survey Research Laboratories, Madison WI, starting in 1989. Also in 1989, the sampling design was changed from a Waksberg method³ to a simple random-digit dial protocol. This change led to a large increase in the number of dialled numbers which were non-working or belonged to businesses (Appendix Table II). Once a telephone was determined to belong to a private residence, the person answering the telephone was asked how many adult (18 years of age or over) males and females lived in the household. A household was considered eligible if at least one adult lived in the household. From the adults in the eligible households, one was selected at random and interviewed. If that person was not in

³A two-stage method of selecting telephone numbers with increased probability of reaching residential households, developed by Waksberg (Waksberg J. Methods for random digit dialing. J Am Stat Assoc 1978;73:40-46). Telephone exchanges are prescreened, and those containing business telephones are excluded from the sample for the study proper. The method relies on the assumption that the telephone companies assign different blocks of telephone numbers, defined by the first 8 digits of the number, to their business and residential customers.

the house at the time the first contact was made, an arrangement was made for call back later. Most calls were made in the early evenings and weekends. Among identified eligible households, 62% of selected household members agreed to be interviewed (Appendix Table II). An average of 1,308 interviews were completed each year in Massachusetts during the years 1986 through 1990.

Choice of population weights

The aim of a telephone-based population survey is to recruit a sample of people who represent the population as a whole. The interviewed sample may not truly represent the target population (the adult, non-institutionalized population of Massachusetts) for any of several reasons. Households have different numbers of adult members, and many homes have two or more different telephone lines. In addition, many households, particularly in lower-income urban areas, do not have telephones and cannot therefore be reached using this survey method. Furthermore, there is also variability inherent in sampling procedures, such that by chance alone the selected household members may differ from the general population on one or more key characteristics. Finally, not every eligible individual reached by the survey interviewers agrees to participate.

A further consideration is that the composition of the population of the state changed from 1986 to 1990. Thus, even if the sample for each year was representative of the population for that year, it may not be possible to compare trends over time or to aggregate the data across years.

The statistical technique of direct standardization (see Appendix Table III for details of the method) enables each of the survey years to be compared to the others. The population of Massachusetts for the year 1988 (the mid-point of the 5 years of data analyzed in this report) was taken as the standard, allowing generalization of the sample to the adult population of the state. The 1988 population estimates within 30 age/sex/ethnicity cells were derived by linear interpolation from the 1980 and 1990 census population counts (Appendix Table IV).

A total of 6,541 interviews were completed during the years 1986 through 1990 (Appendix Table II). Data tapes supplied by the CDC included 6,471 interviews from respondents for whom age and sex were reported. An additional 21 respondents for whom ethnicity could not be determined were excluded from analyses, yielding a total study sample of 6,450. All data were statistically adjusted for age, sex and ethnicity and are presented as the proportion of the population within a specified demographic group that has the characteristic. All proportions are generalizable to the adult population of Massachusetts.

Data presentation

This report presents data concerning 16 risk factors in the fields of cigarette smoking, alcohol consumption, physical activity, seat belt use, and use of preventive clinical services such as routine checkups and screening services for detection of hypertension, high blood cholesterol, breast cancer, and diabetes. The section for each risk factor starts with some background data, followed by a definition of the variables used in this report to ascertain prevalence. Where available, Year 2000 Objectives and baseline data for the general population and for special populations at high risk are presented. Unless stated otherwise, the background information, Year 2000 Objectives and baseline data were obtained from "Healthy People 2000" and have not been further referenced. If the prevalence of the risk factor among the population of Massachusetts is substantially higher than the target, the whole population should be regarded as being at increased risk.

A box highlights population groups at substantially higher risk. For this report, substantial was defined as either 10 percentage points or 50% over the mean for the population as a whole. For example, if overall prevalence of a characteristic is 40%, then prevalence of 50% or more would be considered to be substantially higher, whereas if the overall prevalence is 8%, then prevalence of 12% or more would be regarded as substantially higher. For protective factors, groups with substantially lower prevalence were highlighted.

Eight figures are presented for each risk factor. Each figure presents the prevalence of the risk factor separately for men and women for a selected demographic characteristic. Since the data were adjusted by age, sex and ethnic origin to the population of the state in 1988, changes over time in these factors in the state or the sample do not bias the prevalence estimates. Demographic characteristics should not be interpreted as causes of risk factors or behaviors. Rather, they represent groups in the population which are easily defined and to which appropriate health promotion activities may be targeted.

Year of survey. This figure presents statewide prevalence of the risk factor for each year that information was ascertained. This figure allows estimates to be made of trends in prevalence over time for the population of the state as a whole, and for men and women separately.

The remaining figures present, for men and women separately, data aggregated across all years for which information on that risk factor was collected (except for Region of Massachusetts, see below). These aggregated data, based on up to 6,450 respondents, allow presentation of prevalence of risk factors within demographic strata which, if data from only one year were used, might be too small to yield reliable estimates.

Age in years. Respondents were asked how old they were on their last birthday. Six age categories (18-24 years; 25-34 years; 35-44 years; 45-54 years; 55-64 years; and 65 years or more) were developed from these responses.

Region of Massachusetts. Regions were defined on the basis of the household telephone area code (Western Massachusetts 413; Eastern Massachusetts 508; and Metropolitan Boston 617). As the 508 code was developed in 1988 and became fully operational only in 1989, data in this figure are based on the years 1989 and 1990 (n = 2,504).

Race/ethnicity. Respondents were asked if their race was White; Black; Asian or Pacific Islander; Aleutian, Eskimo or Native American; or Other. They were then asked if they were of Hispanic origin. From responses to these questions, respondents were classified as White but not of Hispanic origin; Black but not of Hispanic origin; Hispanic of any race; or Other. The category Other includes predominantly respondents of Asian origin and are referred to as Asians in this report. Persons who refused to answer either of the questions were excluded from analysis.

Marital status. Respondents were asked if they were married; divorced; widowed; separated; had never been married; or were a member of an unmarried couple. The categories divorced and separated were combined.

Employment status. Respondents were asked if they were currently employed for wages; self-employed; out of work for less than one year; out of work for one year or more; a homemaker; a student; or retired. The categories employed for wages and self-employed were combined into the category working, and the categories out of work for less than one year and out of work for one year or more were combined into the category unemployed. No distinction was made between blue- and white-collar workers.

Educational attainment. Respondents were asked what was the highest grade or year of school they had completed. Responses were coded during the interview into 8 categories: eighth grade or less; some high school; high school graduate or GED certificate; some technical school; technical school graduate; some college; college graduate; or post-graduate or professional training. For this report responses were reclassified into four categories: did not complete high school; completed high school (which included some technical school or technical school graduate); attended college (which included college graduates); and post-graduate or professional training.

Annual household income. Respondents were asked which of the following categories best described their annual household income from all sources: below \$10,000; \$10,000-\$15,000; \$15,000-\$20,000; \$20,000-\$25,000; \$25,000-\$35,000; \$35,000-\$50,000; and \$50,000 or more. These were recoded as below \$15,000; \$15,000-\$35,000; and \$35,000 or more.

Many of the demographic variables are associated with each other. As an example, persons currently attending college are more likely to have never been married, to state their employment status as student, to be in the low or middle income categories, and to be young. Retired respondents are more likely to be widowed than respondents in any other employment category. Black and Hispanic respondents are more likely to live in metropolitan Boston than elsewhere in the state, and were more likely to have lower household incomes than white respondents. Standardization by age, sex and ethnicity does not eliminate these relationships. For example, a risk factor which increases dramatically with age (such as hypertension prevalence), will have low prevalence among students and the never-married simply because these characteristics are themselves closely associated with age. It is beyond the scope of this report to completely adjust for all of these inter-relationships.

General cautionary statements

Prevalence estimates for some subgroups for several risk factors are based on small sample sizes. In cases where there were fewer than 50 respondents in a cell, or fewer than 5 respondents with the risk factor being analyzed, an asterisk has been added to the appropriate bar in the figure. These estimates are highly unstable, and inferences from such data should only be made with extreme caution.

The BRFSS relies on self-report by individuals, without confirmation by medical records or observation of actual behavior. There is potential for introduction of error due to several factors. Respondents may be embarrassed and refuse to answer certain questions. They may also modify their responses to appear more healthy than they truly are. It is known, for example, that self-reported height is often greater than true height, and self-reported weight is less than true weight, such that indices of obesity based on self-reported height and weight result in artificially lower prevalence estimates. The extent to which such biases operate, and to what extent their effect differs, either between populations or between subgroups within a population, has not been adequately resolved for many of the variables in this report.

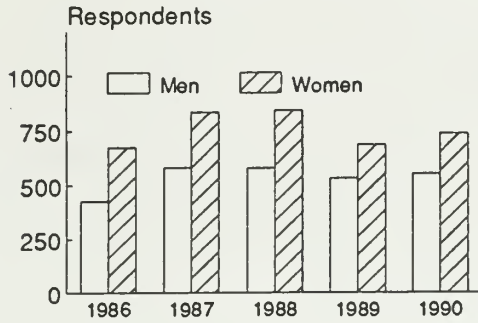
Prevalence estimates obtained using the BRFSS methodology may not, therefore, be comparable to estimates of prevalence of risk factors obtained using personal interview, medical examination, or medical chart review techniques. The BRFSS data are appropriate for assessing trends over time and across demographic groups, and for comparing Massachusetts data with those for other states which cooperate in the BRFSS program.

Demographic characteristics

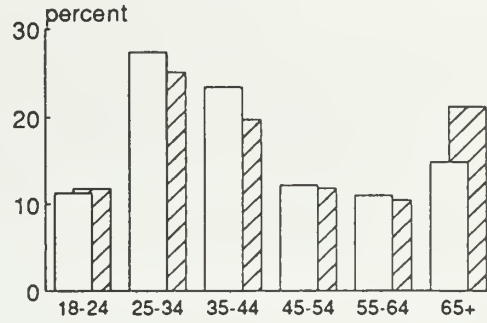
Gender	Men constituted 41% of the sample. After standardization, the proportion of men in the sample was increased to 47%, reflecting the 1988 Massachusetts population estimate.
Age	The 18-24 year old category was underrepresented in the survey, whereas the 25-34 and the 35-44 year-old categories were over-represented, compared with estimates based on the US census. After standardization the proportions in each age category were: 18-24 years - 16%; 25-34 years - 24%; 35-44 years -19%; 45-54 years 13%; 55-64 years - 11%; 65 years or over - 17%.
Region	There were no differences between the unstandardized and the standardized distributions. Fourteen percent of the sample lived in Western Massachusetts, 48% in Eastern Massachusetts, and 38% in the metropolitan Boston area.
Race/Ethnicity	The population of Massachusetts is predominantly white, and hence the number of respondents in the other three categories was small (209 black, 196 Hispanic, and 106 Asian) even after aggregating multiple years of data. Estimates of prevalence of risk factors among non-whites are therefore unstable and should be interpreted cautiously. Standardization led to an increase in the weight given to minority respondents, indicating that they were underrepresented in the original survey data, compared to census counts. After standardization, 89% of the sample were white non-Hispanic, 4% were black non-Hispanic, 3% were Hispanic, and 4% were Asian. The sample sizes were too small to permit analysis of changes in population distribution by race/ethnicity over the survey period.
Marital status	There were no differences in the prevalence of any of these categories over the 5 years of the survey, and there were only trivial differences between the unstandardized and standardized distributions. After standardization, 57% of the sample were married, 9% divorced or separated, 8% widowed, 24% had never been married, and 3% were members of unmarried couples.
Employment	Among men, 76% were working, 4% were unemployed, 5% were students and 15% were retired. There were two male homemakers in the sample. Among women, 57% were working, 5% were unemployed, 15% were homemakers, 5% were students and 18% were retired. There was little change over time in the proportion of the sample within each category and there were only trivial differences between the unstandardized and standardized distributions.

Education	There were only trivial differences between the unstandardized and standardized distributions. After standardization, 14% had not completed high school, 35% had high school diplomas or had attended technical schools, 39% had attended or graduated from college, and 11% had postgraduate or professional training. The distribution of these four categories within the sample did not change over the years of the survey.
Income	Approximately 12% of the sample refused or were unable to answer this question and have been excluded from analyses of risk factors by income level. The proportion reporting household income below \$15,000 declined slightly over the course of the survey, from 20.2% in 1986 to 15.4% in 1990, and there was a comparable increase in the proportion reporting household incomes of \$35,000 or more. It should be noted that these incomes are not adjusted for the effects of inflation. There was a slight excess of low-income women in the survey data compared to the standardized distributions. After standardization, 18% of the sample reported their income as below \$15,000 annually, 34% reported \$15,000 - \$35,000, and 36% reported incomes in excess of \$35,000.

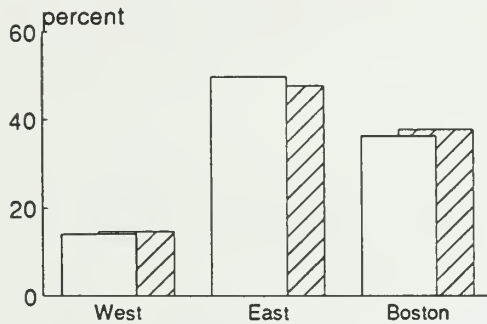
Year of survey



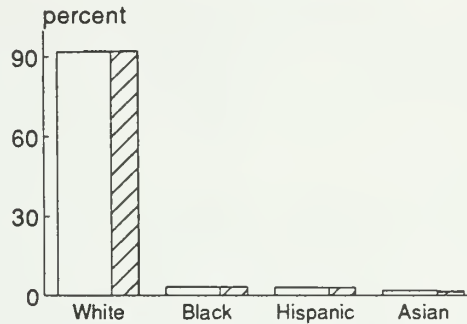
Age in years



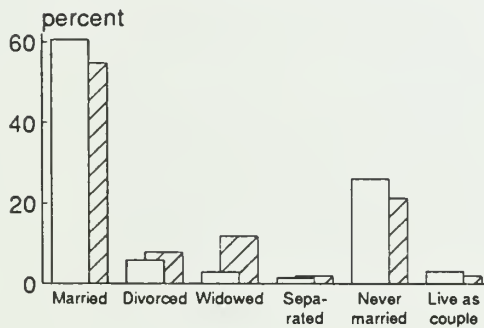
Region of Massachusetts



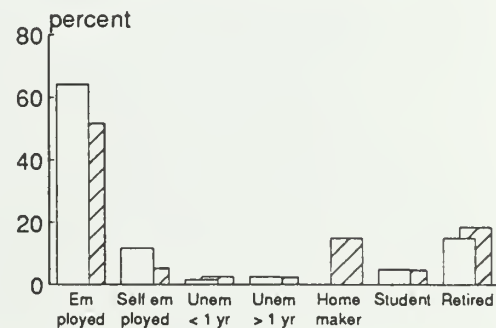
Race/Ethnicity



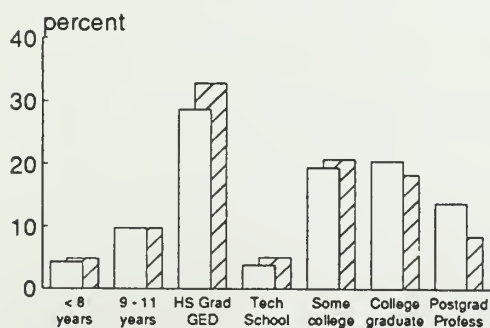
Marital status



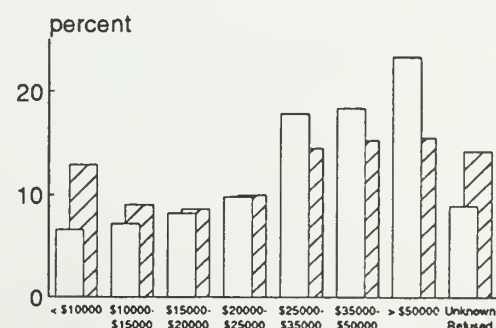
Employment status



Educational attainment



Annual household income



Use of car seat belts

Motor vehicle crashes are the major cause of death and injury to Americans between the ages 1 and 44. The National Highway Traffic Safety Administration has estimated that regular use of lap and shoulder belts are about 45% effective in preventing fatalities and serious injuries.¹

Target population	Year 2000 objective %	National prevalence %	Massachusetts prevalence*
Whole population	85	42	53

* Prevalence in Massachusetts is computed from self-reported usual seatbelt use. National data are not directly comparable as they are computed from direct observation of traffic and include use by infants and children.

Groups at increased risk	Prevalence*
	%
Age 18-24	44
Men in western Massachusetts	38
High school education or less	43
Divorced or separated men	41
Unemployed	42

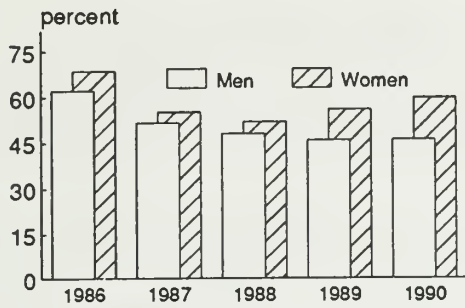
* Lower prevalence implies greater risk of injury or fatality in the event of a crash.

¹Partyka SC, Womble KB. Projected lives savings from greater belt use. Research Note, June 1989. National Center for Statistics and Analysis. Research and Development. National Highway Traffic Safety Administration. Washington DC.

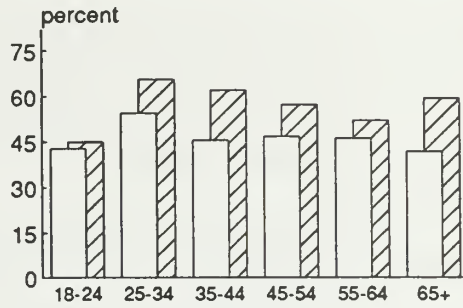
Definition	Reported using seat belts "always" or "almost always" when driving or riding in a car.
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Time trends	Reported seat belt use declined from 66% in 1986 to 50% in 1988, coincidental with the repeal of the mandatory seat belt legislation. Since then there has been a slight increase (to 53% in 1990) in the overall prevalence of seat belt use. There were differences in the trends for men and women since 1988, with usage prevalence increasing from 52% in 1987 to 60% in 1990 among women but continuing to decline, to 46% in 1990, among men. The overall prevalence for the period 1986 through 1990 was 54% (men 50%, women 58%).
Age	Among women, seat belt usage prevalence was lowest among those aged 18-24 years (45%) and highest among women aged 25-44 (63-65%). No clear trend was apparent among men. As a group, the 18-24 year-old category reported the lowest prevalence (44%).
Region	Residents of metropolitan Boston reported the highest seat belt usage (58%). Use was lowest in Western Massachusetts (48%). Consistent trends were observed for men and women.
Race/Ethnicity	Asian respondents (prevalence 63%) were more likely to report seat belt use than respondents of other race/ethnicity.
Marital status	Seat belt usage prevalence was highest among married respondents (men 54%, women 62%). Prevalence of seat belt use was also higher than average among female members of unmarried couples (61%).
Employment	There was little variation among employment categories except that usage among unemployed respondents was lower than average (men 35%, women 47%).
Education	Usage increased steadily with increased educational attainment, from 42% among those with less than high school education to 77% among those with post-graduate training. The trend was consistent for both men and women.
Income	There was an increase in reported seat belt use with increased income, from 47% among those with household income less than \$15,000 to 62% among those with income greater than \$35,000. The trend was stronger for women than for men.

Year of survey



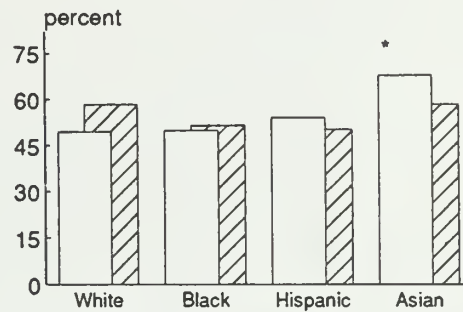
Age in years



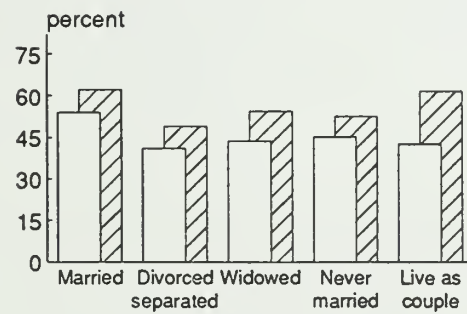
Region of Massachusetts



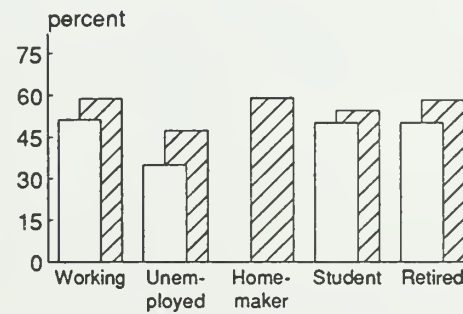
Race/Ethnicity



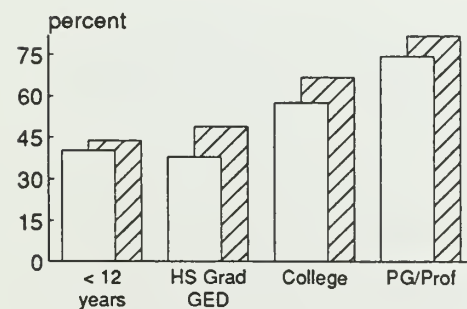
Marital status



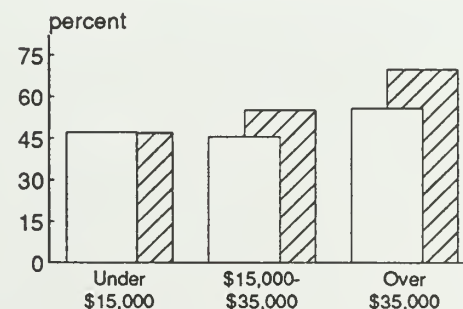
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Comment

Use of car seat belts became compulsory for drivers and other occupants of passenger cars in January 1986. This legislation was repealed by a statewide referendum in November 1986. Currently, the use of seat belts by persons over the age of 12 years is voluntary in Massachusetts.

Seat belt use by adults is mandatory in 41 states, and the Year 2000 Objectives include the objective that laws requiring seat belt use be extended to all 50 states. All states have legislation requiring that young children be appropriately restrained by seat belt or safety harness.

In 1990 the proportion of Massachusetts residents who reported using their seat belts all or most of the time was 53%. In the same year, the median proportion across 45 states and territories was 74%. Only five states (Mississippi, Nebraska, North and South Dakota, and Rhode Island) reported lower prevalence of seat belt use.

Overweight

Overweight is a major risk factor for cardiovascular disease, arthritis, noninsulin-dependent diabetes, and many other conditions. Overweight is also associated with hypertension, and weight reduction reduces blood pressure. While overweight is best diagnosed by physical examination, it may be estimated from an individual's height and weight by computation of the Body Mass Index (BMI), calculated as weight in kilograms divided by the square of the height in meters. Prevalence of overweight increases with age, and weight reduction is difficult to sustain. Interventions therefore need to emphasize prevention of accumulation of excess weight in childhood and early adulthood.

Target population	Year 2000 objective %	National prevalence %	Massachusetts prevalence* %
Whole population	20	26	20
Special populations			
Low-income women	25	37	25
Black women	30	44	26
Hispanic women	25	37	24

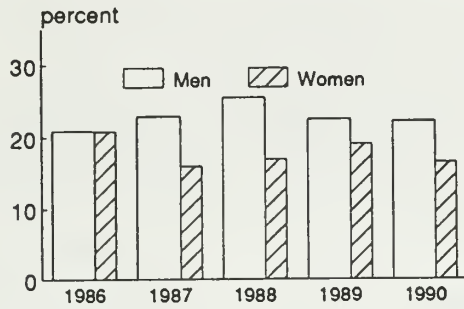
* Prevalence in Massachusetts may be underestimated as it is computed from self-reported height and weight, whereas national norms are computed from measured height and weight.

Groups at increased risk	Prevalence %
Men aged 45-54	33
Unemployed women	30
Women with less than high school education	29

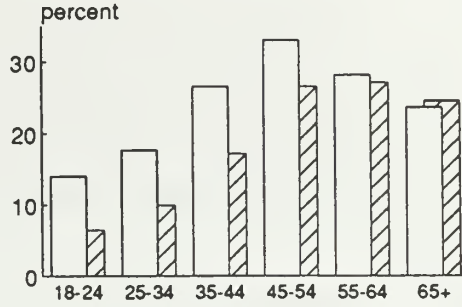
Definition	Body Mass Index (computed from self-reported height and weight) exceeding 27.8 kg/m ² (men) or 27.3 kg/m ² (women).
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Time trends	Overweight prevalence was unchanged from 1986 through 1990, fluctuating between 19 and 21% in each year. The mean prevalence of overweight in the population was 20% (men 23%, women 18%).
Age	Prevalence of overweight increased markedly between ages 18-24 (men 14%, women 7%) and 45-54 (men 33%, women 27%). Among older age groups, prevalence declined among men (to 24% among men aged 65 and over) and remained stable among women.
Region	Among men, prevalence of overweight was lower in metropolitan Boston (20%) than in both eastern and western Massachusetts (23%). Among women the trend was reversed: women living in metropolitan Boston reported the highest prevalence of overweight (20%).
Race/Ethnicity	Hispanic and Asian men reported lower than average weight for height (13-14% overweight). Black men and black and Hispanic women were more likely to be overweight (24-27% prevalence) than white women.
Marital status	Widowed and never-married men and male members of unmarried couples had lower than average prevalence of overweight (17-20%). Among women, lower than average levels of overweight were reported among those never married (12%) and female members of unmarried couples (6%). Widowed women had elevated levels of overweight (prevalence 25%).
Employment	Overweight was least prevalent among students (9%), and lower among working women (14%) than working men (23%). Overweight prevalence was highest (30%) among unemployed women and retired men (25%) and retired women (26%).
Education	Prevalence of overweight was strongly and inversely related to educational attainment. Among those with less than a high school education, prevalence of overweight was 28%, whereas among those with postgraduate training the prevalence was 13%.

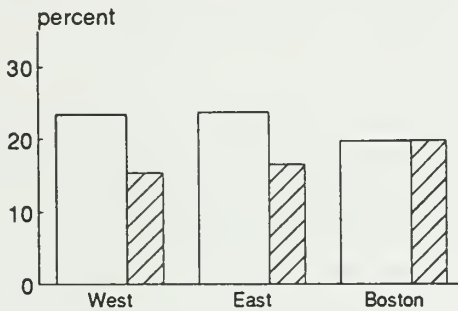
Year of survey



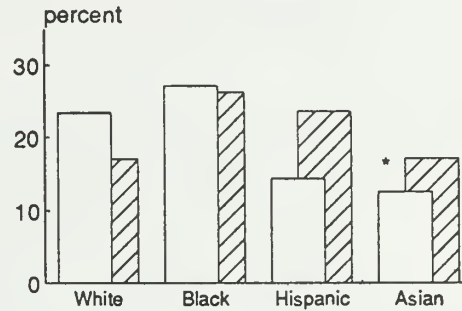
Age in years



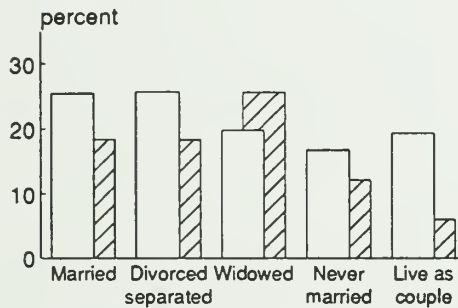
Region of Massachusetts



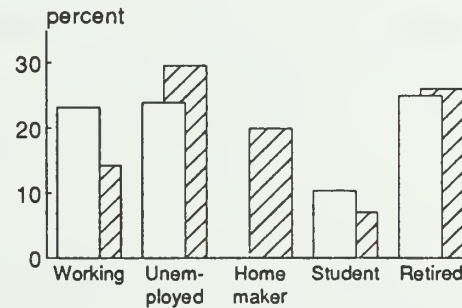
Race/Ethnicity



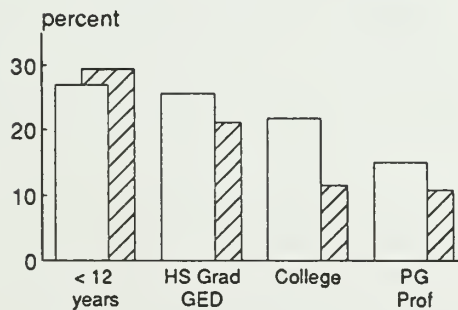
Marital status



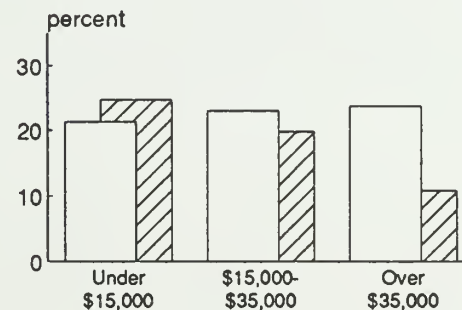
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Income Income was inversely associated with prevalence of overweight among women. Prevalence of overweight among women with household income below \$15,000 was 25%, declining to 11% among those with household incomes over \$35,000. Among men a less marked trend of increased overweight with increased household income was observed.

Comment Nationally, there has been no change in the prevalence of overweight, based on measured height and weight, over the period 1960 - 1980. Prevalence of overweight is higher among black and Hispanic women compared to men, and is also high among women with lower incomes and less education.

Indices of overweight derived from reported height and weight are biased and underestimate the true prevalence of overweight. It is not appropriate to compare specific estimates from the BRFSS data to other sources that utilize measured values. Nevertheless, it is possible to examine trends within this data set, and to compare these estimates to data from the BRFSS system nationally. In 1990 the median prevalence of obesity across the 45 states and territories participating in the BRFSS was 22.6%. In the same year, only three states reported lower prevalence of overweight.

Exercise

Regular physical activity can help to prevent coronary heart disease, hypertension, noninsulin-dependent diabetes, osteoporosis and obesity, and can alleviate several mental health problems such as mood swings, depression, anxiety and poor self-esteem. Life expectancy of physically active people exceeds that of inactive people.

For coronary heart disease specifically, the risk of disease among inactive people is nearly double that of active people. Inactivity elevates this risk only slightly less than cigarette smoking, hypertension or high blood cholesterol. Furthermore, given the high prevalence of inactive lifestyles, it has been estimated that physical activity may be exerting the greatest impact on public health with respect to coronary heart disease, which is itself the leading cause of mortality in the country.

There is good evidence that even moderate physical activity, below the threshold for improvement in cardiovascular and respiratory fitness, has benefits, including a reduction in risk of coronary heart disease. Small differences in exercise levels among the most inactive sectors of the population are associated with the largest magnitude of decreased risk. Thus the least physically active are those individuals most likely to benefit from increases in physical activity levels.

Potential intervention strategies for encouraging exercise should emphasize the benefits to be derived from even light-to-moderate exercise and the additional benefits of aerobic fitness. Specific physical activities to be suggested include fun-walks, gardening and other forms of gentle, regular exercise. Use of aerobic exercise and fitness facilities should be encouraged, as should development and implementation of policies promoting exercise in work places.

Two measures of physical activity are presented. The first shows the prevalence of sedentary lifestyles, while the second describes the distribution of individuals who exercise regularly.

Sedentary lifestyle

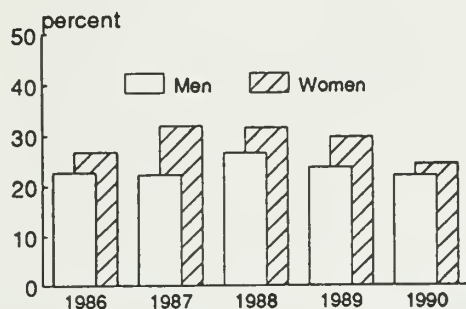
Target population	Year 2000 objective %	National prevalence %	Massachusetts prevalence %
Whole population	15	24	26
Special populations			
Low-income	17	32	40
Age 65+	22	43	43

Groups at increased risk	Prevalence %
Age 65 plus	43
Blacks	39
Hispanic women	37
Asian men	41
Asian women	49
Lower income	40
Less than high school education	44
Retired	42
Unemployed women	39
Widowed	45

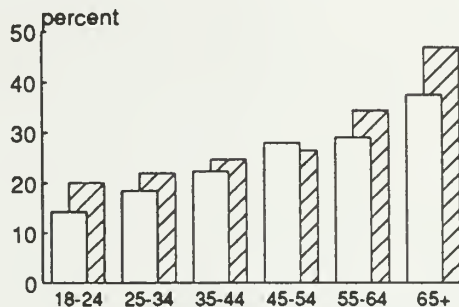
Definition	Reported no leisure-time physical activity in past month.
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Time trends	Among women, there has been a decline in prevalence of sedentary lifestyle, from 27% in 1986 and a high of 32% in 1987 to 24% in 1990. Among men, there was no change in prevalence over time. Prevalence of sedentary lifestyle was higher among women than among men. Mean prevalence was 23% among men, and 29% among women. For the population as a whole there has been little change, although the prevalence in 1990 did show a decline from 1988 levels.
Age	Prevalence of sedentary lifestyle increased with age in both men and women, with 17% of respondents aged 18-24 years, and 43% of people aged 65 years and over, reporting little or no exercise in the past month.
Region	There was no variation by region in the prevalence of sedentary lifestyle.
Race/Ethnicity	Asian men reported a higher prevalence of sedentary lifestyle (33%). Black, Hispanic and Asian women all reported higher than average prevalence (39%, 37% and 49%, respectively).
Marital status	Among both men and women those never married and those who were members of unmarried couples reported lower than average prevalence of sedentary lifestyles (18-20%). Widowed men and women reported higher than average levels (45%).
Employment	Students reported the lowest prevalence of sedentary lifestyle (16%). Prevalence among retired (42%) and unemployed (34%) respondents were higher than average.
Education	Prevalence of sedentary lifestyles declined by education level among both men and women, from 44% among those with less than high school education to 16% among respondents with post-graduate training.
Income	Among both men and women, those in the lowest income category were more likely to have a sedentary lifestyle (40%) than those with annual household incomes above \$35,000 (19%).

Year of survey



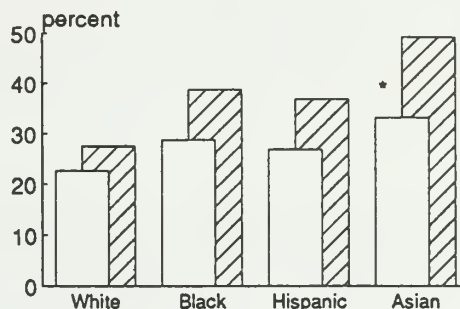
Age in years



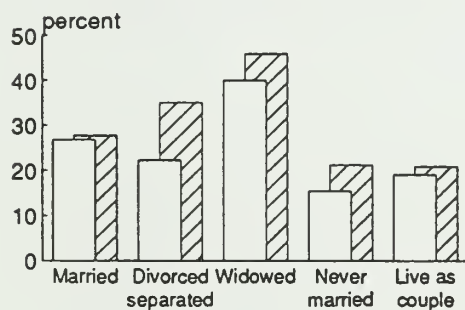
Region of Massachusetts



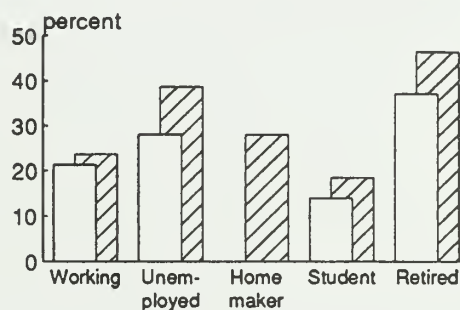
Race/Ethnicity



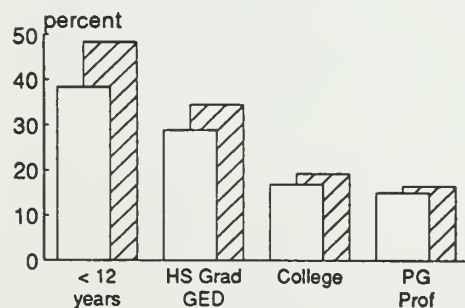
Marital status



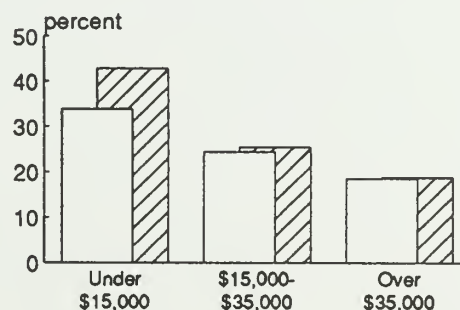
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Regular aerobic exercise

Target population	Year 2000 objective %	National prevalence %	Massachusetts prevalence %
Whole population	20	12	9
Special populations			
Low-income	12	7	8

Groups at increased risk

Prevalence*

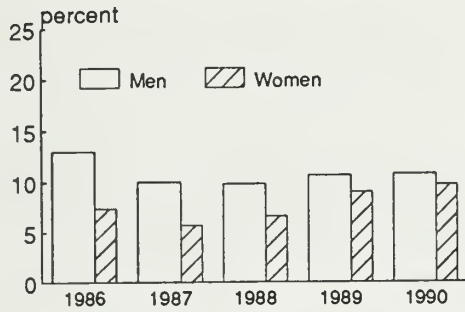
	%
Blacks	4
Asians	5
Women aged 18-24	5
Unemployed	4
Less than high school education	5

* Lower prevalence implies increased risk of cardiovascular disease.

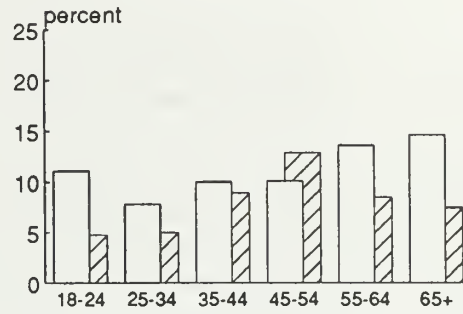
Definition	Reported performing vigorous physical activities that promote the development and maintenance of cardiorespiratory fitness 3 or more times a week, 20 minutes or more per occasion.
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Time trends	Prevalence of regular exercise declined from 1986 to 1987 but has been rising ever since, reaching 10% in 1990. Most of the rise has been due to an 80% increase in the prevalence of regular exercise among women, from 6% in 1987 to 10% in 1990. Among men there has been no change in the prevalence of regular exercise. The mean prevalence over time was 8% among women and 11% among men.
Age	Among men the highest prevalence of regular exercise was reported among older age groups (15% among men aged 65 and over). Among women, the pattern was different, with women aged 45-54 reporting the highest prevalence (13%). Young women aged 18-34 reported prevalence of only 5%.
Region	Western Massachusetts reported the lowest prevalence of regular exercise (6%), with men in this region reporting only 4% prevalence. Among women, there was less variability across regions.
Race/Ethnicity	Black and Asian men and women reported lower than average prevalence of regular exercise (Blacks 4%, Asians 5%). Hispanic men also reported a slightly lowered prevalence (9%).
Marital status	There was little variability in regular exercise by marital status. The only deviation from the mean was for widowed men, among whom the prevalence of regular exercise (21%) was twice the average.
Employment	Among men, students (15%) and retirees (13%) reported higher than average prevalence of regular exercise, whereas the unemployed (5%) reported lower prevalence. Among women, the only sector to differ from the mean was the unemployed, among whom prevalence of exercise was 3%.
Education	Educational attainment was strongly associated with the prevalence of regular exercise in both men and women. Among respondents with less than high school education, prevalence was 5%, whereas among those with post-graduate training the prevalence was 17%.

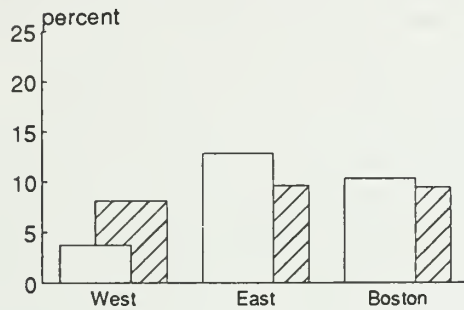
Year of survey



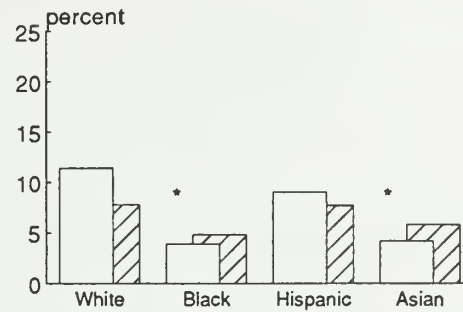
Age in years



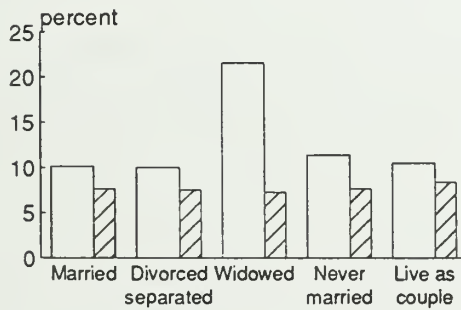
Region of Massachusetts



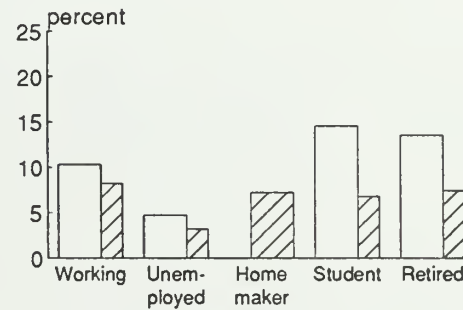
Race/Ethnicity



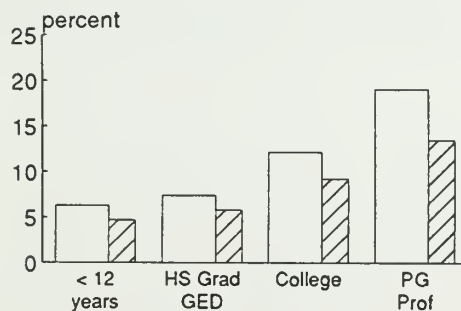
Marital status



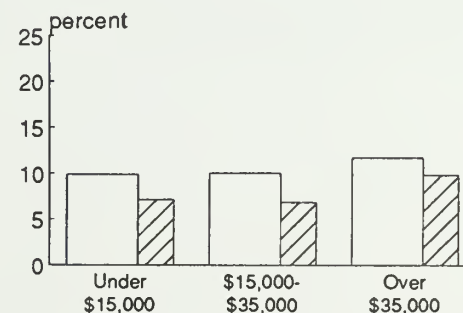
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Income Among respondents in the highest income category there was a small increase in the prevalence of regular exercise. This effect was more noticeable among women.

Comment Prevalence of sedentary lifestyles, as reflected by low reported rates of physical activity, is lower in Massachusetts than in 40 of the 45 states participating in the BRFSS, and is declining over time. Nevertheless, over half the population of Massachusetts gets little or no regular physical activity, and only 10% meet the CDC definition for regular exercise. Thus, the Commonwealth as a whole has not yet achieved the Year 2000 objectives. The variation in prevalence of physical activity by subgroups within Massachusetts is similar to that seen nationally.

Smoking

Tobacco use is the leading cause of premature death in the United States, responsible for one in every six deaths. In particular, tobacco use increases the risk for diseases of the heart and circulatory system; cancer of the lung, larynx, pharynx, oral cavity, esophagus, pancreas and bladder; chronic bronchitis and emphysema; respiratory infections; and stomach ulcers. Passive (involuntary) smoking increases the risk of lung cancer among adults, and severe respiratory problems and otitis media among infants and young children. It is estimated that 390,000 deaths annually are directly attributable to cigarette smoking. In Massachusetts in 1986, 21% of deaths among persons over the age of 35 (11,305 deaths) were attributable to cigarette smoking.¹

Smoking prevalence within a community is a function of the proportions of individuals who never started to smoke (never smokers), those who smoked at one time but successfully quit (former smokers), current smokers who have tried to quit but have been unsuccessful (relapsed smokers), and current smokers who have not tried to quit. The BRFSS is adequate to assess trends in smoking cessation and attempts at quitting. The prevalence of never-smokers in the adult population will remain static until school-aged youngsters currently being exposed to smoking prevention interventions become adults. Results of smoking prevention activities are therefore not detectable in the BRFSS. In this report, prevalence of three categories of smoking status are analyzed: current smokers, relapsed smokers, and former smokers.

Nicotine is highly addictive. Quitting smoking, therefore, can be difficult, particularly in the absence of a supportive environment, and relapses are common. Efforts need to be made to remotivate relapsed smokers and encourage repeated attempts to quit. Since 90% of adult smokers started to smoke regularly before age 21, efforts to prevent initiation of smoking should be targeted at adolescents. Such activities could focus on school-based education as well as stricter enforcement of legislation prohibiting sale of cigarettes for use by minors. Smoking cessation activities could involve implementation of smoke-free policies in the work place and in enclosed public areas, support groups for individuals trying to quit or to maintain abstinence, and development of better clinical methods for assisting individuals to overcome their physical and psychological dependence on cigarettes and tobacco.

¹Massachusetts Department of Public Health. Smoking: Death, Disease and Dollars. Massachusetts Department of Public Health, Boston MA, November 1991.

Current smokers

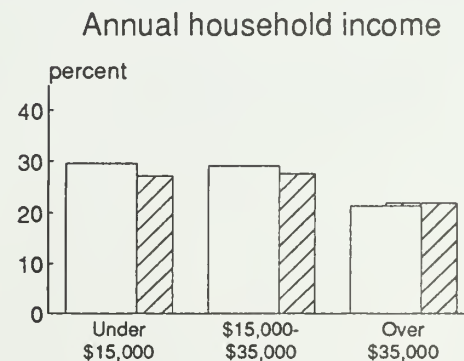
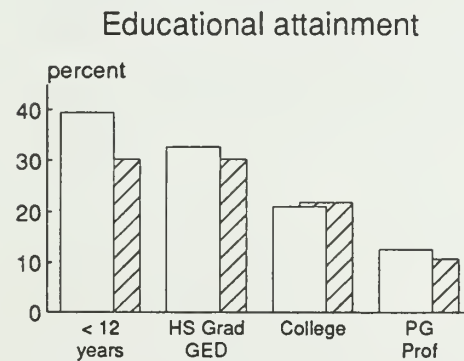
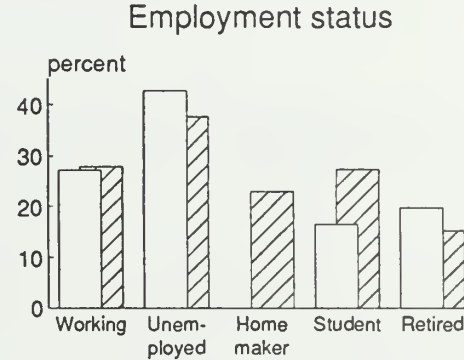
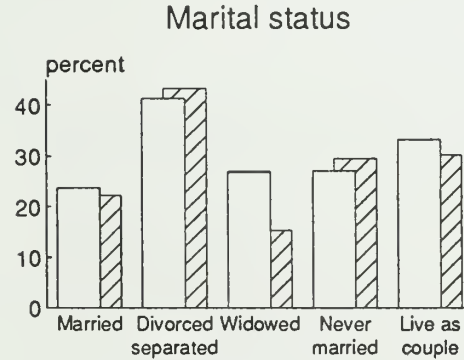
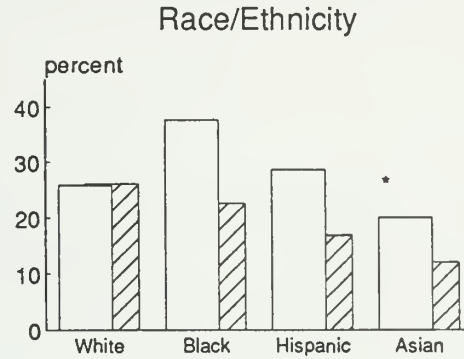
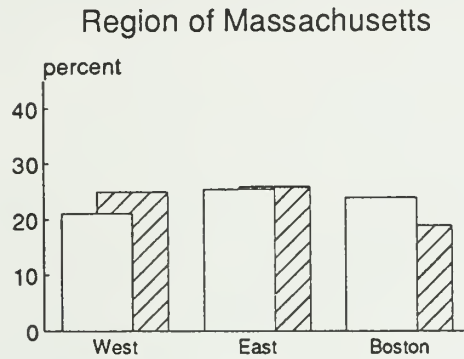
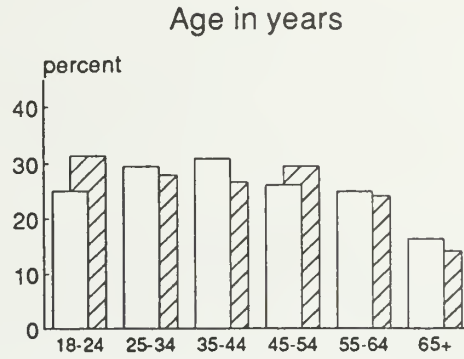
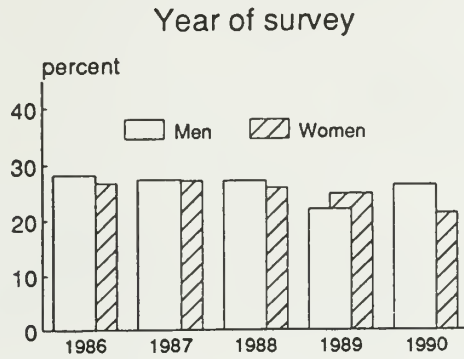
These individuals represent the target population for future smoking cessation programs. They are people who have not been successfully reached by current and past smoking prevention and smoking cessation programs. The prevalence is estimated by the number of individuals who currently smoke out of the total population.

Target population	Year 2000 objective %	National prevalence %	Massachusetts prevalence %
Whole population	15	29	26
Special populations			
High school education or less	20	34	32
Blacks	18	34	30
Hispanics	18	33	23
Women aged 18-44	12	29	28

Groups at increased risk	Prevalence %
Black males	38
Less than high school education	35
Divorced or separated	43
Unemployed	40

Definition	Respondents answering affirmatively to the questions "Have you ever smoked 100 or more cigarettes in your life?" and "Do you now smoke cigarettes?"
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Time trends	In 1986 the proportion of people who reported smoking regularly was 27%, declining to 23% in 1990. This represents a 15% drop from the 1986 level. Most of the change occurred between 1988 and 1989. Mean prevalence over the study period was 26%.
Age	Smoking prevalence was highest (31%) among women aged 18-24 years. Among this age group, 25% of men smoked. There were only small differences between smoking prevalence for men and women at other ages. The elderly were less likely to be smokers, 15% as opposed to 28-29% for respondents aged 18-54 and 25% for respondents aged 55-64.
Region	In western Massachusetts women were more likely to smoke than men, whereas in metropolitan Boston men were more likely to smoke. Prevalence was highest (26%) in eastern Massachusetts and lowest (21%) in metropolitan Boston. These percentages, derived from data for 1989 and 1990 only, are lower than those for other figures due to the decline over time in smoking prevalence.
Race/Ethnicity	Smoking prevalence was higher for black, Hispanic and Asian men than for women. No such differential was observed for white respondents. Black men reported the highest smoking prevalence (38%), Asian women the lowest (12%).
Marital status	Divorced and separated respondents were more likely to smoke (43%) than any other group. Widowed men were more likely to smoke than widowed women. Differences between men and women in other categories were small.
Employment	Smoking prevalence was highest among unemployed respondents (men 43%, women 38%) and lowest among students and retirees. There was a marked difference between smoking prevalence for male (17%) and female (27%) students.
Education	Smoking prevalence was highest among respondents who had not completed high school (men 39%, women 30%) and declined strongly with increasing level of education. Among those with post-graduate training, only 12% reported smoking cigarettes.
Income	Respondents reporting household income over \$35,000 were less likely to smoke than those with lower incomes.



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Relapsed smokers

Individuals who have recently attempted to quit smoking but have been unsuccessful are relapsed smokers. The denominator for this variable is current smokers, and the numerator is those who have attempted to quit in the past year but are still smoking. They are people who have been motivated to quit smoking, but have lacked the resources to remain abstinent. Alternatively, those current smokers who have not tried to quit in the past year can be seen as lacking the motivation to quit.

Target population	Year 2000 objective	National prevalence	Massachusetts prevalence
Whole population	50% of smokers to have quit for at least one day	34%	46% of smokers quit for at least one week

Groups at increased risk

Prevalence*

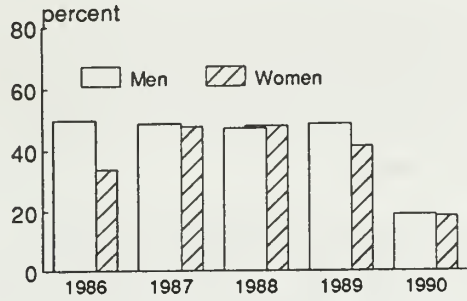
	%
Aged 55 +	36
Retired	32
Widowed men	33
Women in western Massachusetts	33

* Lower prevalence implies increased risk of disease through lack of attempting to quit smoking.

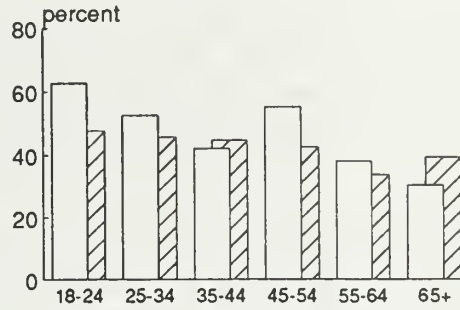
Definition	
1986-1989	Current smokers who responded affirmatively to the question "Have you stopped smoking for a week or more sometime during the past year?"
1990	Current smokers who affirmed that they had ever made a serious attempt to stop smoking, that the most recent attempt was within the past year, and that they had stayed off cigarettes for more than seven days that time.

- Time trends** The drop in the proportion attempting to quit between 1989 and 1990 is an artifact of changes in the questionnaire. Analyses by demographic characteristics are based on the data for 1986 through 1989 only. Between 1986 and 1989 there was no change in the proportion of men attempting to quit (50%), whereas among women there was an increase between 1986 and 1987, from 35 to 50%, then a decline to 40% in 1989. The overall quit attempt proportion from 1986 through 1989 was 46%.
- Age** Younger smokers were more likely to have attempted to quit smoking (55%) than older respondents (35%). Almost 63% of young male smokers (ages 18-24) reported trying to quit. Among women smokers in this age group the proportion attempting to quit was 49%. There were smaller gender differences at other ages.
- Region** There was little difference in attempt ratios across regions, although in western Massachusetts women smokers were less likely to have tried to quit than males. These estimates are based on relatively few subjects as only data from 1989 were analyzed.
- Race/Ethnicity** Apart from Hispanics, all minority groups showed higher attempt ratios than whites. This was especially true for Black males (74%), Asian men (66%) and Asian women (79%), although these estimates are all based on small sample sizes.
- Marital status** Widowed male smokers were less likely to have attempted to quit smoking in the previous year, and unmarried smokers of either sex were more likely to have made unsuccessful attempts to quit.
- Employment** Student smokers were the most likely to have attempted to quit, with 77% of men and 50% of women unsuccessfully trying to quit.

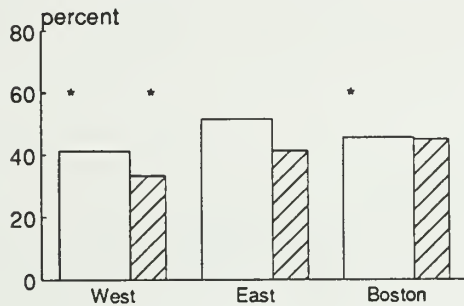
Year of survey



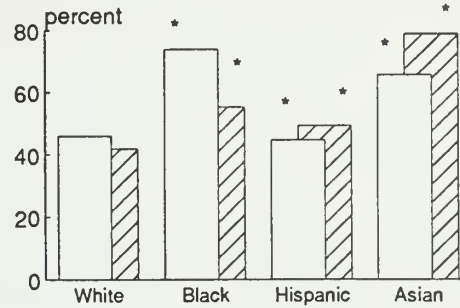
Age in years



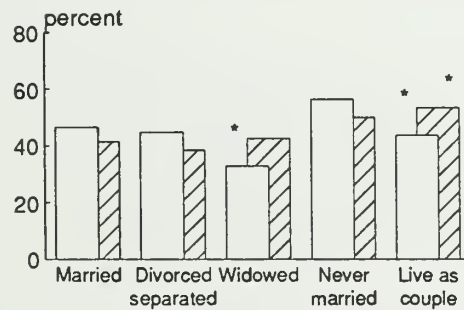
Region of Massachusetts



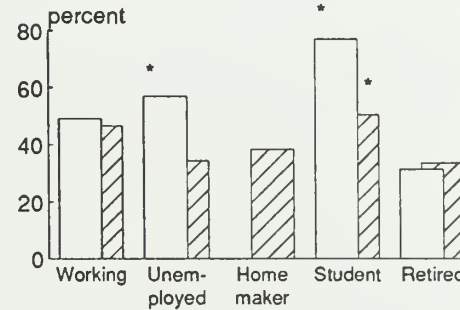
Race/Ethnicity



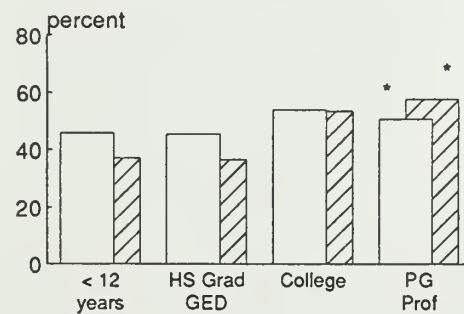
Marital status



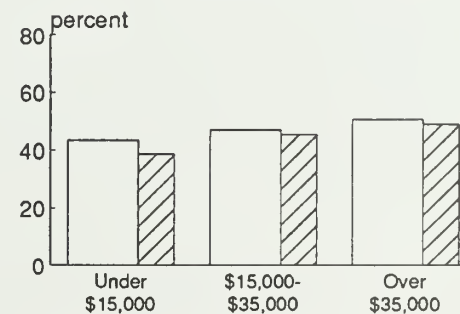
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

== BRFSS, Massachusetts 1986-90 ==

- Education** The proportion of smokers who reported attempting to quit in the previous year increased with increasing levels of education. Among those with less than a high school education, 42% had tried to quit; among those with postgraduate training, the proportion was 53%. This trend was stronger among women.
- Income** There was little variation in the proportion attempting to quit by income level, although there was a slight trend for prevalence of attempts to quit to rise with increased household income.

Former smokers

Former smokers are the success stories of campaigns such as National Smokeout Day, Kick the Habit and others. Prevalence of former smoking is called the quit ratio. The denominator for the quit ratio is persons who have ever smoked; the numerator is those who have successfully quit. The BRFSS prior to 1990 does not measure duration of abstinence from cigarette smoking. It is also not possible to ascertain the age at which smoking cessation occurred.

No specific Year 2000 objective has been developed for this variable.

Massachusetts prevalence 53%

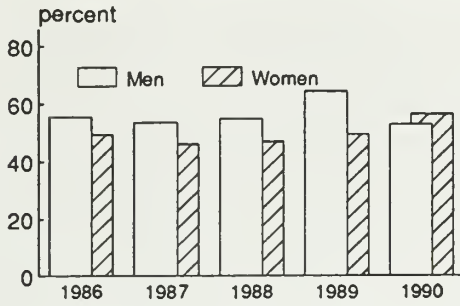
Groups at increased risk	Prevalence*
	%
Aged 18-34	39
Blacks	32
Unemployed	34
Women with less than high school education	41
Divorced or separated	39
Never married	35

* Lower prevalence implies increased risk of disease through continuation of smoking.

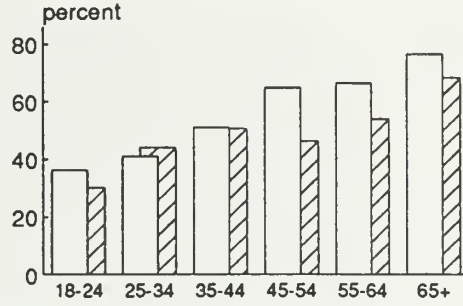
Definition	Respondents who answered affirmatively to the question "Have you ever smoked 100 or more cigarettes in your life?" and negatively to the question "Do you now smoke cigarettes?"
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Time trends	Among women the quit ratio has increased every year, except for the years 1986-87. No clear time trends were evident for men. The quit ratio for women exceeded that for men in 1990, following four years in which men were more likely to have quit than women. Overall, 53% of people who ever smoked have successfully quit.
Age	There was a strong relationship between age and quit ratios. This was most clearly evident for men. Among women, the proportion who quit was 45-50% over the ages 25 through 54, after which age the proportion who quit rose consistently. Older men were more likely to have quit than older women.
Region	Women living in metropolitan Boston were more likely to have successfully quit (59%) than those living elsewhere in Massachusetts (49-53%). Among men, those in western Massachusetts were the most likely to have quit (65%).
Race/Ethnicity	The quit ratio was lowest for black males (29%), with black (36%) and Asian (35%) females also having low quit ratios.
Marital status	Quit ratios were 60% for both married and widowed respondents, and lower (35-40%) for other categories. There was little difference between men and women within categories of marital status.
Employment	Two sectors, the unemployed (both male and female) and female students, showed low quit ratios (27-34%). For all other sectors quit ratios exceeded 50%.
Education	There was a consistent education trend: among people with less than high school education who ever smoked, 45% had quit, whereas among those with post-graduate training, 75% had quit. Men were more likely to have quit than women at all education levels except for the highest, where the quit ratios for men and women were equal.
Income	Higher-income respondents who had ever smoked (quit ratio 60%) were more likely to have quit than those with lower household incomes (quit ratio 48%).

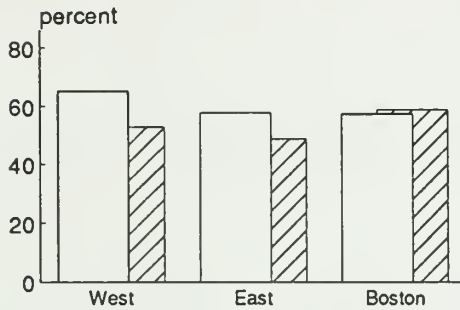
Year of survey



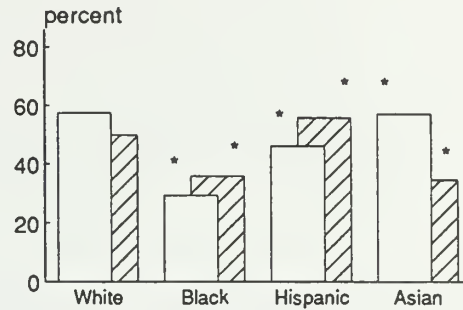
Age in years



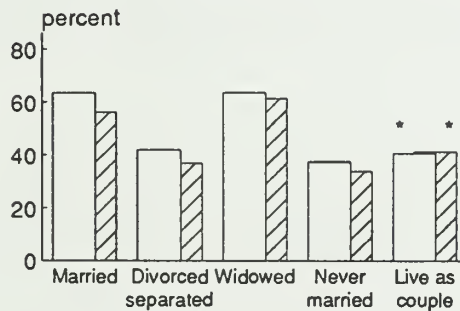
Region of Massachusetts



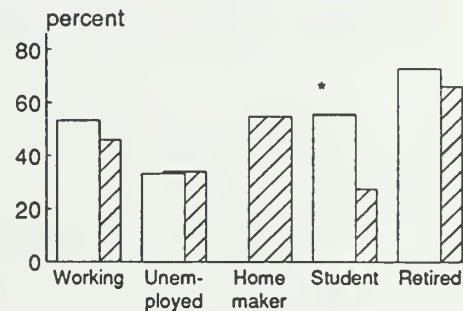
Race/Ethnicity



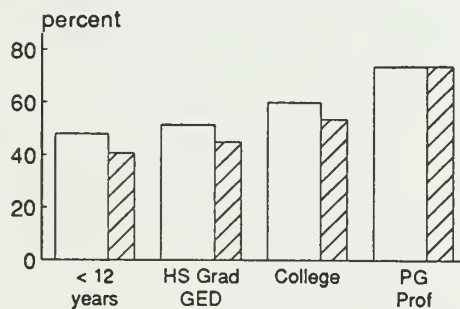
Marital status



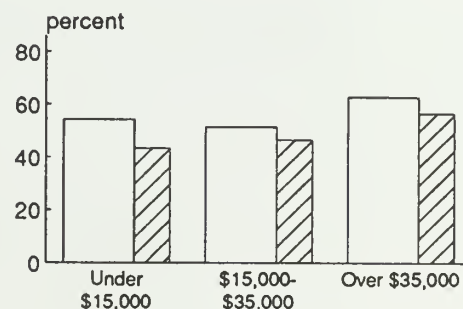
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Comment

Smoking prevalence is declining in Massachusetts. This trend is probably attributable to the widespread dissemination of information concerning the effects of smoking on health. Smoking prevalence is higher among young women, people with lower educational attainment, the unemployed, divorced and separated people, and blacks. These findings are consistent with national data, which for 1987 show overall prevalence of 29%, prevalence among blacks of 34%, among high school graduates of 34%, and elevated prevalence of smoking among blue-collar workers.

Based on the BRFSS, Massachusetts ranked 26th of 45 states with respect to smoking prevalence in 1990. Smoking prevalence in Massachusetts is still above the target of 15% among all sectors of the population except for those with post-graduate training. Therefore, efforts to prevent young people from starting to smoke and to encourage smokers to quit must be continued.

Overall, approximately 50% of those who ever smoked no longer do so, a proportion which is increasing slowly. The most obvious success has been the high quit ratios seen among older men. Sectors of the Massachusetts population with low quit ratios include blacks of both genders, female students, and the unemployed, among whom about 70% of ever-smokers still smoke. The quit ratio for the United States as a whole was 45% in 1985, having risen from 30% in 1965. Among blacks nationally, the quit ratio was 32% in 1985. Among those with less than high school education, the national quit ratio was 40% in 1985; among college attenders, 63% of those who ever smoked had successfully quit.

With respect to relapsed smokers, national data suggest that 32% of smokers tried to quit in 1986. One quarter of these persons successfully abstained for three months or more. Blacks were as likely to quit, but less likely to maintain abstinence, than whites. College graduates were both more likely to quit and more likely to maintain abstinence than persons with high school education. These findings suggest that substantial sectors of the population have been reached and motivated by the messages of the antismoking campaigns, but lack the skills to maintain smoke-free status. Efforts to encourage cessation and facilitate successful abstinence need to be continued for all groups of smokers. Efforts to reach minorities, women and people with less than high school education need to be intensified to increase cessation success.

Alcohol

Excessive alcohol consumption may have adverse effects both on the drinker and on others. Alcohol is implicated in nearly half of all fatal intentional injuries (such as homicides, suicides) and over half of all traffic fatalities. Alcohol-related traffic crashes are the leading cause of death among young Americans. Alcohol use during pregnancy is a major cause of birth defects. Alcohol consumption is the major cause of liver cirrhosis, and is also implicated in a wide variety of fatal and non-fatal residential and recreational injuries, such as falls, fires and drownings. Conversely, there is an accumulating body of evidence that moderate alcohol consumption may be protective against cardiovascular disease. This benefit to the drinker has to be weighed against the risks to the community of encouraging widespread moderate alcohol consumption.

The BRFSS data provide prevalence data for three measures of alcohol consumption: binge drinking, chronic drinking, and driving after alcohol consumption. It should be remembered that these data are self-reported.

There are no Year 2000 objectives that directly address these alcohol consumption behaviors in the general population. Rather, the objectives call for reductions in alcohol-related mortality, primarily traffic fatalities and cirrhosis. Targets have been developed for delays in initiation and reductions in frequency of alcohol consumption among adolescents (who are not covered by the BRFSS design) and young adults. An additional target calls for the reduction of alcohol related traffic fatalities to no more than 8.5 per 100,000 people per year, a reduction of 13% from the 1987 level.

Potential intervention strategies for binge drinking and driving after consumption of alcohol could focus on two areas. First, legislation prohibiting driving while intoxicated and purchase and consumption of alcohol by minors could be more aggressively enforced. Second, campaigns such as "Know when to say when," increased use of designated drivers, and alternating alcoholic beverages with nonalcoholic beverages during a drinking session, could be encouraged. Chronic drinking may be evidence of alcohol dependency, which requires clinical or psychological support.

Binge drinking

Target population	Year 2000 objective	National prevalence	Massachusetts prevalence
Whole population	No Objective has been defined	15%	21%
Special populations			
College students	32% in past 2 weeks	42%	32% in past month

Groups at increased risk

Prevalence

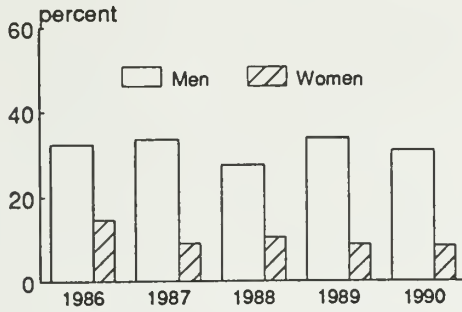
%

Male students	47
Female students	24
Men aged 18-24	54
Women aged 18-24	27
Hispanic men	39
Never married men	49
Never married women	22

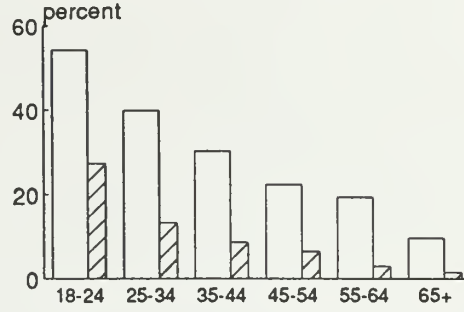
Definition	Reported having 5 or more drinks on an occasion at least once in the past month.
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- Time trends** There has been little change in the overall prevalence of binge drinking. In 1986 the prevalence was 23%, declining only to 19% by 1990. Prevalence among men (31%) has consistently been three times that among women (10%).
- Age** There was a strong relationship between age and binge drinking: 46% of respondents aged 18-24 years reported binge drinking, as opposed to only 5% of respondents aged 65 years and over. This trend was evident for both men and women.
- Region** There was little variation in the prevalence of binge drinking by region.
- Race/Ethnicity** Asian men (19%) and women (4%) reported lower prevalence of binge drinking than men and women of other races/ethnicities. Hispanic men reported the highest prevalence of binge drinking: 39%.
- Marital status** Prevalence of binge drinking was highest among never-married respondents and those living as a couple. Among men, prevalence in these groups was 49 and 39%, respectively; among women the prevalence in these groups was 22 and 21%. The sector with the lowest prevalence was the widowed (men 18%, women 3%).
- Employment** Students reported higher prevalence of binge drinking (men 47%, women 24%). Lower prevalence was reported by female homemakers (6%) and male (10%) and female (1%) retirees.
- Education** Those with post-graduate education reported a lower prevalence of binge drinking (males 20%, females 5%). For the other categories of educational attainment, there was a trend of increasing prevalence of binge drinking with increased education.
- Income** The lowest prevalence of reported binge drinking was among those with the lowest household income, although overall differences among income categories were small.

Year of survey



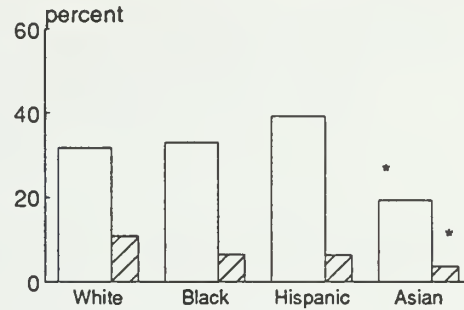
Age in years



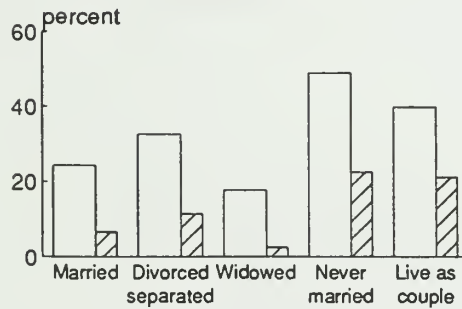
Region of Massachusetts



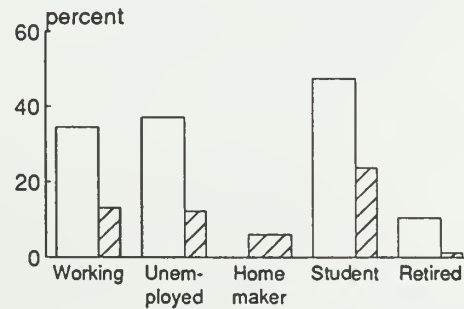
Race/Ethnicity



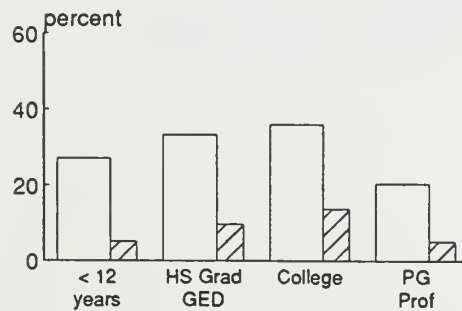
Marital status



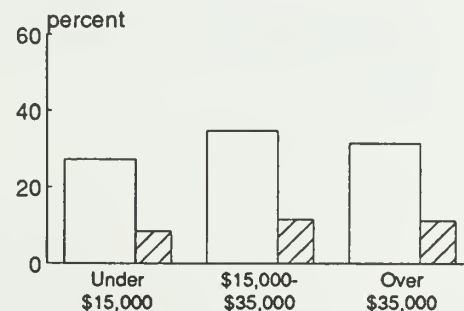
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Chronic drinking

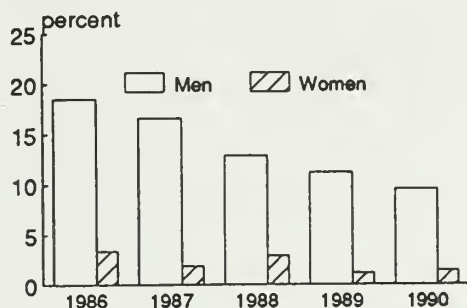
Target population	Year 2000 objective	National prevalence	Massachusetts prevalence
Whole population	No objective has been defined for prevalence.	3%	7%
	Mean per-capita annual intake of ethanol 2 gallons (equivalent to 36 drinks per month)	2.5 gallons ethanol per year (equivalent to 45 drinks per month)	17 drinks / month

Groups at increased risk	Prevalence %
Unemployed men	22
Divorced or separated men	20
Black men	19

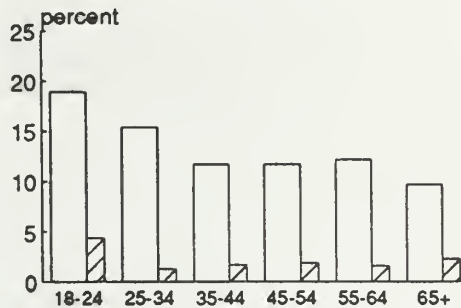
Definition	Reported drinking 60 or more alcoholic drinks in the past month.
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Time trends	The prevalence of reported chronic drinking declined from 10% in 1986 to 5% in 1990. Prevalence was seven-fold higher among men (14%) than among women (2%). Only 88 women reported drinking more than 60 alcoholic drinks per month. Prevalence estimates for women subdivided into other demographic categories are unstable and need to be interpreted with caution. Among men, prevalence of chronic drinking was 19% in 1986, declining to 9% in 1990. For women the trend over time showed less consistency.
Age	Reported chronic drinking was highest among the younger age groups (19% among men aged 18-24 years) declining to 10-12% for men aged 35 and older and 1-2% among women aged 25 and older.
Region	There was little variation by region among men. Prevalence among women showed a threefold increase from Western Massachusetts (prevalence 0.5%) to metropolitan Boston (1.5%). These data need to be interpreted with caution, as they are based on only 20 female chronic drinkers.
Race/Ethnicity	Prevalence of chronic drinking was highest among black men (19%). One Asian man of 49 interviewed reported chronic drinking. Prevalence among non-white women could not be calculated reliably as only 4 non-white women reported chronic drinking.
Marital status	Married women reported lower prevalence of chronic drinking (1%) than other groups of women (3-4%). Divorced and separated (20%) and never-married (18%) men reported the highest prevalence.
Employment	Unemployed men reported the highest prevalence of chronic drinking (22%), followed by working men (14%). Among women, homemakers reported the lowest prevalence (1%), with other sectors all in the range 2-3%.
Education	Prevalence was lower among higher-educated men (16% among high school graduates, 9% among those with post-graduate training), except that men with less than high school education reported a prevalence of 14%. Among women, this trend was reversed: prevalence was 3% among women with post-graduate training, and 1% among women with less than a high school education.
Income	There was little variation in prevalence of chronic drinking by household income categories.

Year of survey



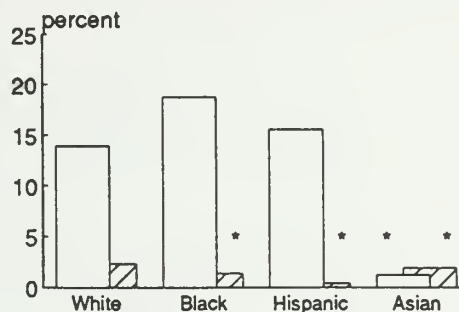
Age in years



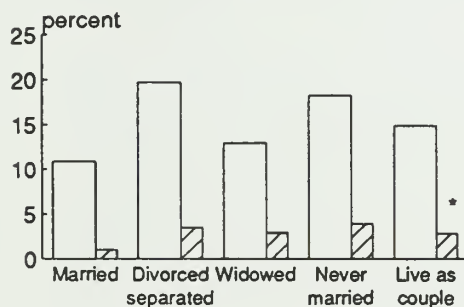
Region of Massachusetts



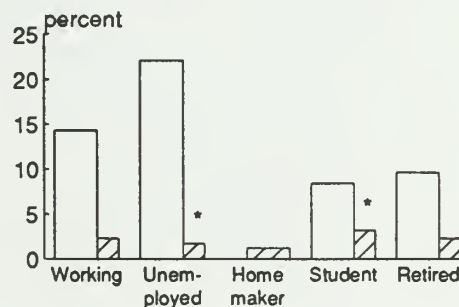
Race/Ethnicity



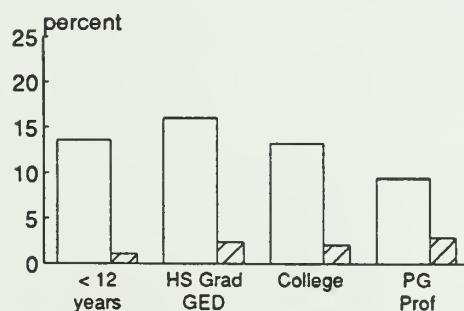
Marital status



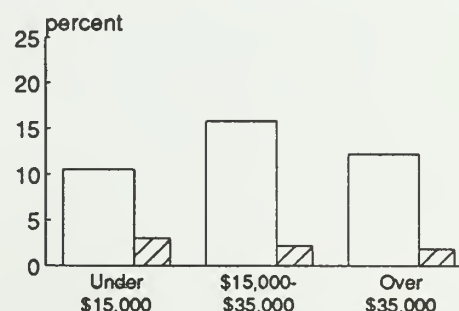
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Driving after consumption of alcohol

No Year 2000 objective has been defined for this variable.

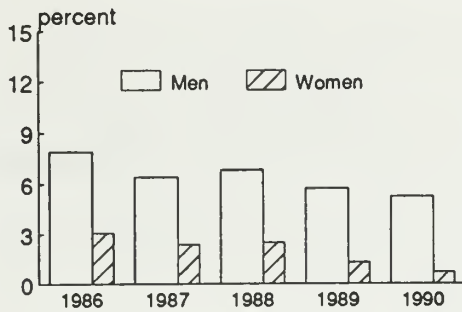
National median prevalence	2.8%
Massachusetts prevalence	4%

Groups at increased risk	Prevalence %
Men aged 18-24	13
Women aged 18-24	6
Never-married men	12
Never-married women	5

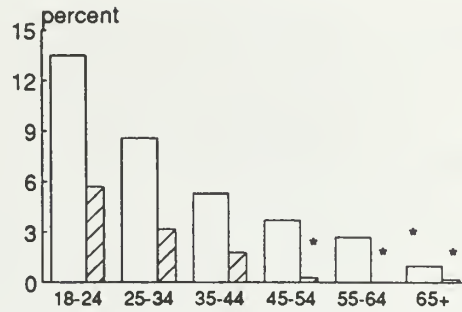
Definition	Reported driving "after having had perhaps too much to drink" at least once in the past month.
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- Time trends** There has been a small but steady decline in the prevalence of this behavior, from 6% in 1986 to 3% in 1990. This decline was observed among both men and women. Overall prevalence for men was 6%; for women the overall prevalence was 2%.
- Age** Reported driving after alcohol consumption was strongly age-dependent. Prevalence among 18-24 year-old men was 13%, declining to 1% among those over 65 years. Among women the same trend, but at lower prevalence, was observed throughout the age distribution.
- Region** Prevalence among men in western Massachusetts (7%) was slightly higher than in eastern Massachusetts and metropolitan Boston (5%). For women a similar trend, although based on very few subjects (only 19 women reported driving after alcohol consumption in 1989 or 1990), was apparent.
- Race/Ethnicity** Estimates of driving after alcohol consumption among non-white men and women were highly unstable as they are based on 19 positive responses.
- Marital status** Reported prevalence was highest among the never-married (9%) and those living as a couple (10%), and lowest among the widowed (1%).
- Employment** Retirees (men 1%, women 0.2%) and female homemakers (0.3%) reported lower than average prevalence. There was little variation between other groups.
- Education** College attenders reported the highest prevalence (men 8%, women 3%), while those with post-graduate training reported the lowest prevalence (men 4%, women 1%).
- Income** Among men, prevalence increased with income (lowest income group 4%, highest income group 7%). Among women, no trends were observed across income levels.

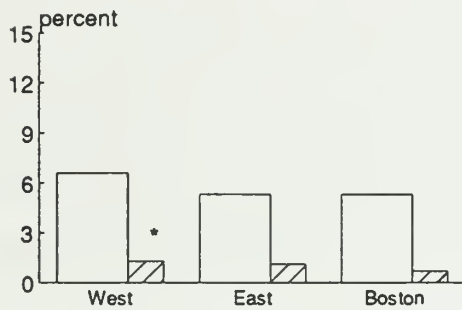
Year of survey



Age in years



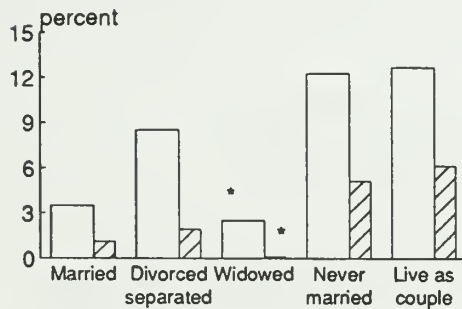
Region of Massachusetts



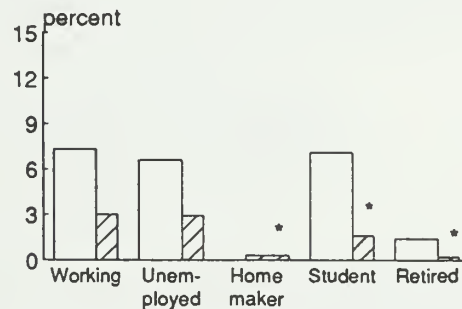
Race/Ethnicity



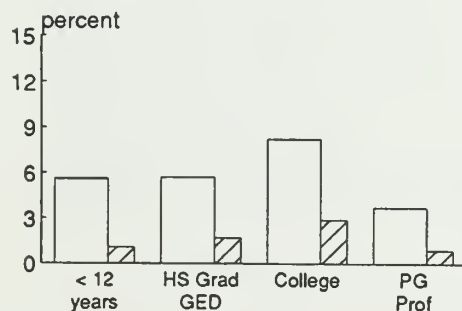
Marital status



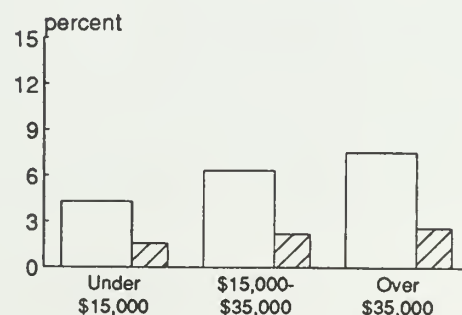
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Comment

Driving while intoxicated is illegal and may therefore be under-reported in this survey. In addition, the variable as defined leaves room for individual interpretation by the respondents. One could envisage some people using the legal definition of too much, whereas others may have felt they were able to drive even though they may have been legally intoxicated. This differential interpretation may help to explain the otherwise surprising gradient in prevalence with income, and, to a lesser extent, with education.

Routine checkup

Preventive clinical health services have been seen as key intervention strategies for reducing underlying risk for disease. They provide an environment where immunization, disease screening and health education activities can be integrated. Their effectiveness in reducing morbidity and mortality is well documented. Public awareness of the utility of clinical prevention services is high; in national surveys, up to 90% of respondents affirmed that going to a doctor for regular checkups could help to prevent and control breast and cervical cancer and high blood pressure. However, the strongest predictor of failure to receive recommended screening tests among women aged 45-64 years was lack of health insurance. In addition, physicians who serve more than 50% minority Medicaid patients see more patients, spend less time with each patient and tend to incorporate fewer preventive practices into each encounter than do physicians who serve a more affluent clientele.

No specific Year 2000 objective has been defined for this variable.

Massachusetts prevalence 68%

Groups at increased risk	Prevalence*
	%
Men aged 25-34	45
Men aged 35-44	50
Never-married men	50
Members of unmarried couples	51

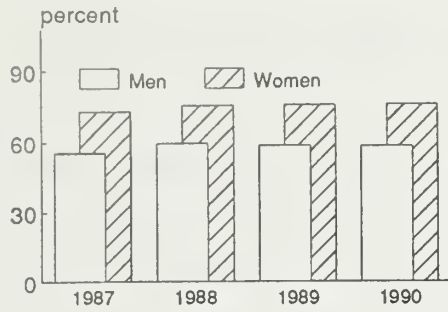
* Lower prevalence implies increased risk of preventable disease remaining undetected.

Definition

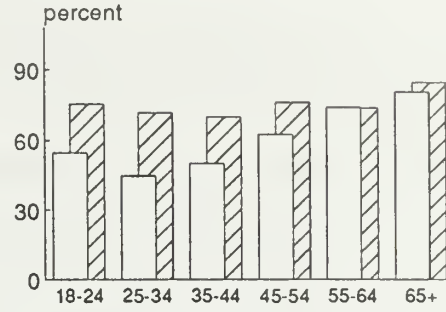
Reported going to see a doctor for a routine checkup in the past year even though respondent was feeling well.

Time trends	This question was not administered in 1986. The prevalence of routine checkups in the past year was high (68%). Women (76%) were more likely to report having had a checkup in the past year than men (58%). After a rise from 64% in 1987 to 68% in 1988, the prevalence has not changed. This pattern was similar for both men and women.
Age	At all ages until 55, women were more likely to have had a recent checkup than men. From age 55 the prevalence was similar for men and women, largely due to an increased prevalence among older men compared to younger men. Among women prevalence exceeded 70% at all ages, and there was very little change in prevalence until after age 65, at which point prevalence rose to 85%.
Region	Among men, prevalence was highest in western Massachusetts (65%) and lowest in eastern Massachusetts (56%). There was no variation by region among women.
Race/Ethnicity	Black (93%) and Hispanic (87%) women reported recent checkups more frequently than white (74%) or Asian (71%) women. Among men, blacks had the highest prevalence of recent checkups (71%), whereas whites had the lowest (57%).
Marital status	Among men, widowed respondents were most likely (83%) to report having had a checkup in the past year, whereas 40% of males living as a couple and 50% of never-married men so reported. Among women the pattern was similar, although there was less variation.
Employment	Among both men and women, retired persons were most likely to report having had a recent checkup (mean 83%), while working men reported the lowest prevalence (53%).
Education	Among both men and women, routine checkups were inversely associated with educational attainment. Among women, the prevalence ranged from 81% among those with less than high school education to 67% among women with post-graduate training. Among men, the range was 69% to 49% for the same two groups.

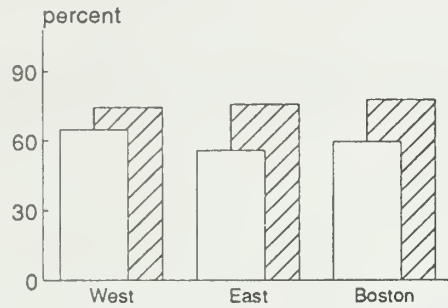
Year of survey



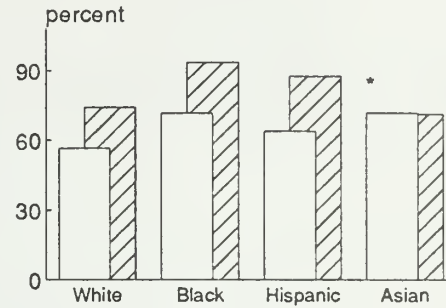
Age in years



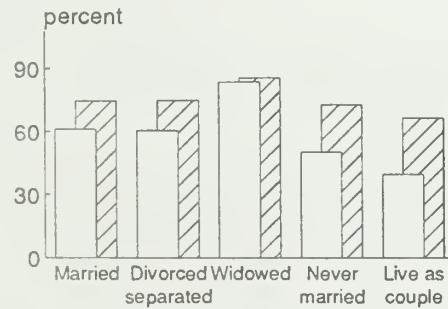
Region of Massachusetts



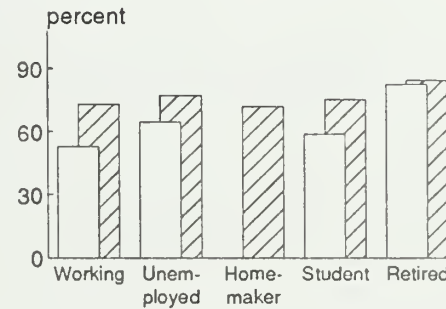
Race/Ethnicity



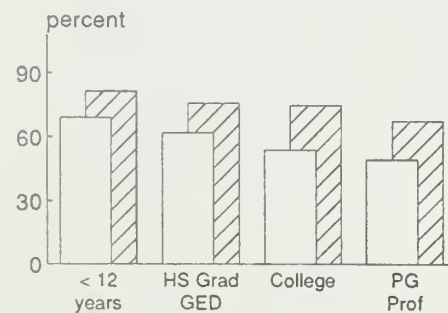
Marital status



Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Income Respondents with lower household income were more likely to report having a recent checkup (men 73%, women 81%) than respondents with higher incomes.

Comment This question was intended to ascertain the prevalence of preventive medical care. The question may have been misinterpreted by the respondents to the BRFSS, who may have reported any contact with a physician, rather than a routine checkup. Data from the National Health Interview Survey suggest that the average American makes 5 visits to a doctor annually, and that 76% of the population reported visiting a physician (for any reason) in the preceding year, a figure comparable with the data obtained in the Massachusetts BRFSS. The Centers for Disease Control have not analyzed this variable, so BRFSS prevalence estimates are not available for other states or for the nation.

High blood pressure

High blood pressure increases the risk of stroke seven-fold, and the risk of coronary heart disease three to four-fold. Blood pressure tends to increase with age and should therefore be re-evaluated periodically. Behavioral factors known to affect blood pressure are weight, physical activity and, to a lesser extent, diet. Blood pressures of 140/90 mmHg or higher, recorded on more than one occasion, are indications for treatment. Treatment options range from behavior modification to any of several categories of pharmaceuticals.

No specific Year 2000 objective has been defined for this variable.

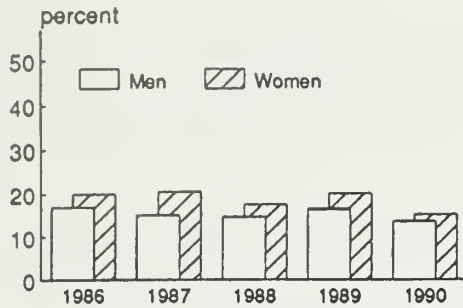
Massachusetts prevalence 17%

Groups at increased risk	Prevalence %
Lower income	31
Age 55-64	33
Age 65+	42
Women with less than high school education	38
Widowed	43
Retired	42

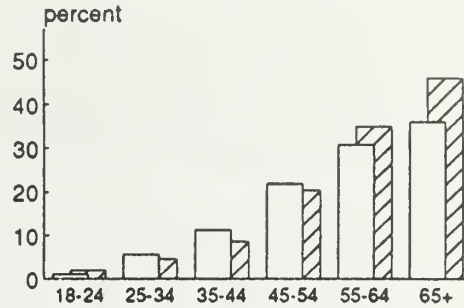
Definition	Responded affirmatively to the question "Have you ever been told by a doctor, nurse or other health professional that you have high blood pressure" and to either "Have you been told on more than one occasion that your blood pressure was high?" or "Is any medicine currently prescribed for your high blood pressure?"
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- Time trends** The prevalence of diagnosed hypertension has declined from 19% in 1986 to 14% in 1990, although the decline was not consistent from one year to the next. Overall prevalence over the period of the survey was 17%. A similar trend was observed in both men and women. Mean prevalence was 15% among men and 19% among women. The median prevalence across all states in 1990 was 16%.
- Age** Prevalence of diagnosed hypertension increased from near zero among respondents aged 18-24 years to 36% among men aged 65 and over and 46% among women aged 65 and over. From age 55 the prevalence of hypertension was higher among women than among men, while below this age prevalence of hypertension was similar for men and women.
- Region** Among both men and women, respondents from western Massachusetts had a higher prevalence of hypertension (19%) than respondents in the east (17%) or in metropolitan Boston (14%). This pattern was more noticeable among women.
- Race/Ethnicity** Hypertension prevalence among Hispanic and Asian respondents (8 and 7% respectively) was less than half that of black (20%) and white (18%) respondents.
- Marital status** Prevalence of hypertension among widowed women (47%) was high, and prevalence among widowed men was slightly elevated (26%). Prevalence among never-married respondents and respondents who were members of unmarried couples were both low (7 and 2%, respectively).
- Employment** Prevalence of hypertension was highest among retirees (men 36%, women 47%), and was also slightly elevated among the unemployed (19%) and among homemakers (17%). Very low prevalence (1%) was reported among students.

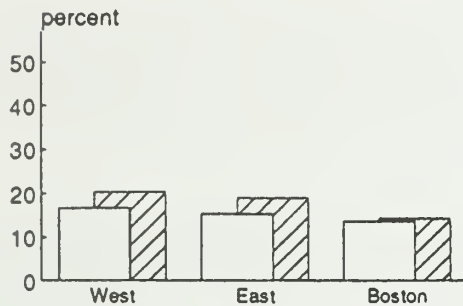
Year of survey



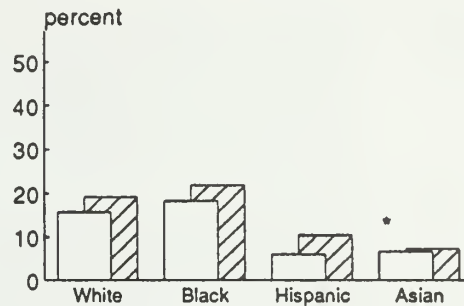
Age in years



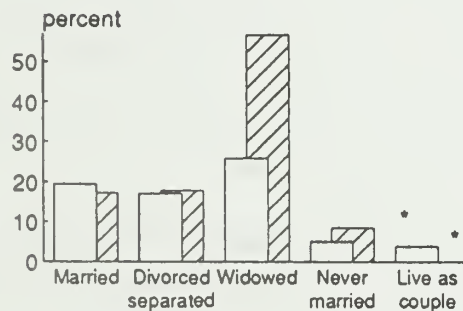
Region of Massachusetts



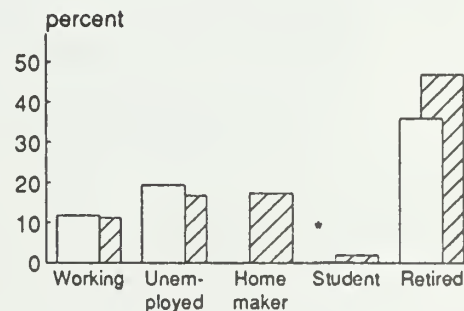
Race/Ethnicity



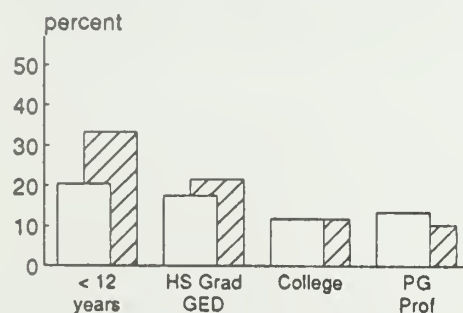
Marital status



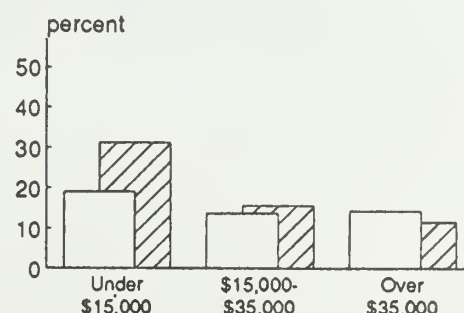
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Education Prevalence was highest among respondents with less than high school education (women 33%, men 21%). The differential between men and women was not observed at other levels of educational attainment. Prevalence was lowest among those with college or post-graduate training (12%).

Income Women in households with less than \$15,000 reported elevated prevalence of hypertension (31%), compared to 19% among men with similar incomes and 11-15% among men and women with higher household incomes.

Comment The prevalence of hypertension in the 1990 Massachusetts BRFSS was 14%. The median prevalence for 45 states and territories was 16%, and 35 states reported prevalence estimates higher than the Massachusetts level.

This variable was developed by the Centers for Disease Control as a surrogate for diagnosed hypertension. To the extent that not all adult Americans have ever had their blood pressure checked, it may be inaccurate. This problem is common to all self-reported diagnoses. Prevalence of hypertension may not, therefore, be comparable to that reported by surveys where blood pressure levels are measured. The Second National Health and Nutrition Examination Survey found that only 54% of adults were aware of their high blood pressure. The Seven States Study found that 66% of hypertensives were aware of their condition. These data are now over 10 years old and the proportion of hypertensives who are aware of their blood pressure level is likely to be higher.

In surveys where blood pressure has been measured, it has been found that 30% of adults have elevated blood pressure (systolic 140 mmHg or higher or diastolic 90 mmHg or higher). Blacks have higher prevalence of hypertension than whites. The relations between hypertension incidence and age are at least in part caused by increases in weight that commonly occur throughout adulthood.

Blood cholesterol

High levels of serum (blood) cholesterol increase the risk for coronary heart disease, particularly myocardial infarctions. It has been estimated that a 1% drop in serum cholesterol leads to a 2% decline in risk of death. Many behavioral factors affect serum cholesterol levels, including diet, obesity and exercise. Cholesterol screening is simple and relatively accurate even on a casual blood specimen. Current guidelines call for screening all adults every five years, with more frequent retesting for individuals with borderline levels of cholesterol (200 - 239 mg/100 ml serum) and treatment, using both pharmacologic and behavioral means, for individuals with serum cholesterol levels of 240 mg/100 ml or higher.

The major Year 2000 objectives for blood cholesterol address mean serum cholesterol levels and prevalence of elevated cholesterol in the general population. As such, they are not comparable to data obtained by the BRFSS, as no estimate of serum cholesterol level can be determined for respondents who have never had their cholesterol checked. Similarly, Year 2000 objectives which address management of diagnosed elevated serum cholesterol levels cannot be evaluated using the BRFSS methodology.

Two measures of cholesterol status are analyzed for this report. The first is the prevalence of screening, whereas the second estimates the yield of screening activities by assessing the prevalence of elevated cholesterol among those screened.

Ever had cholesterol checked

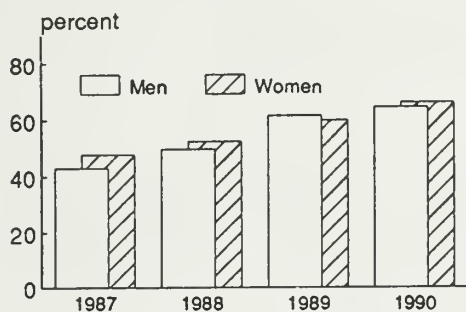
Target population	Year 2000 objective	National prevalence	Massachusetts prevalence
Whole population	75 % "within past 5 years"	59 % "ever"	55 % "ever"

Groups at increased risk	Prevalence %
Ages 18-24	28
Age 25-34	42
Never married	37
Members of unmarried couple	40
Students	29
Black men	31
Black women	47

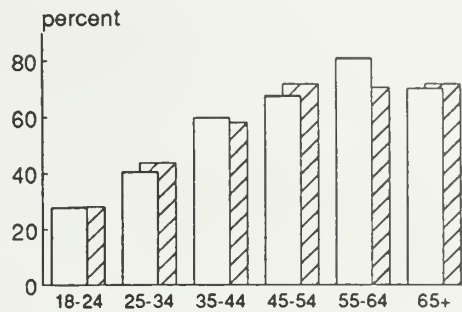
Definition	Responded affirmatively to the question "Have you ever had your blood cholesterol checked?"
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Time trends	In 1990, 65% of respondents had ever had their serum cholesterol checked, an increase of 50% from the 1987 prevalence of 46%. There were only small differences between men and women. The mean prevalence of cholesterol screening was 55%.
Age	Prevalence of cholesterol screening increased consistently from a low of 28% among respondents aged 18-24 to a high of 75% among those aged 55-64 years. Among respondents age 45 and over, fully two thirds reported having had a cholesterol screen.
Region	Cholesterol screening was lowest among women in western Massachusetts, but the differences between regions were small.
Race/Ethnicity	Prevalence was highest among white respondents (57%) and lowest for Black men (31%). Among women, Asians reported the lowest prevalence (38%).
Marital status	Prevalence was lower than average among never-married respondents (33%) and those living as a couple (42%), and slightly higher than average among widowed respondents (66%).
Employment	Students reported the lowest prevalence of screening (26%), compared with working (53%) and unemployed (46%) respondents. Retirees reported the highest prevalence (72%).
Education	Prevalence of screening was highest among those with post-graduate training (69%). There was little variation among the other three categories of educational attainment (range 49 - 54%).
Income	Respondents in the highest income category were most likely to reporting having a cholesterol screen (64%), compared with 46% among those in lower income groups. In the lowest income groups, women were more likely to report having a cholesterol screen than men, a pattern not apparent in the highest income group.

Year of survey



Age in years



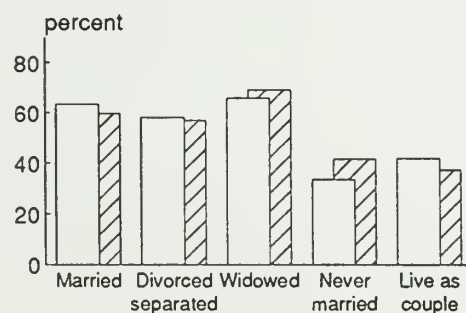
Region of Massachusetts



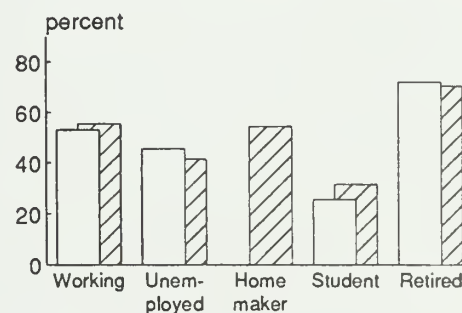
Race/Ethnicity



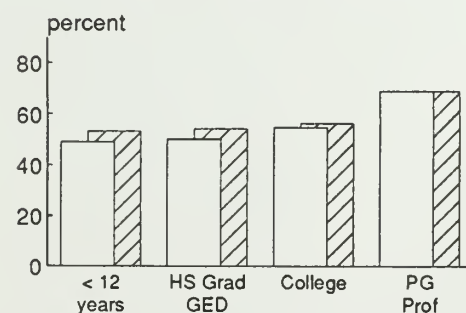
Marital status



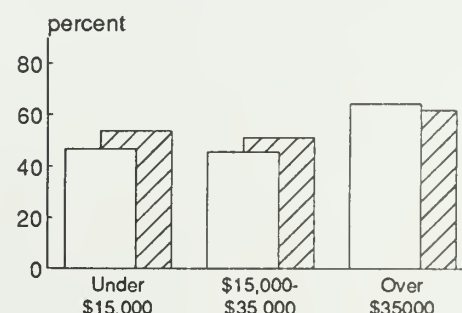
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Ever been told cholesterol is high

This variable is a measure of the effectiveness of screening programs that attempt to identify individuals with elevated serum cholesterol. A screening program administered to a low-risk population represents an inefficient use of limited resources.

No specific Year 2000 objective has been defined for this variable.

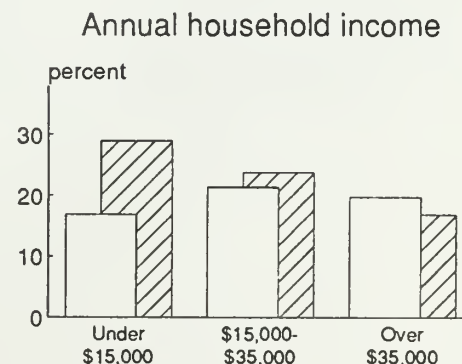
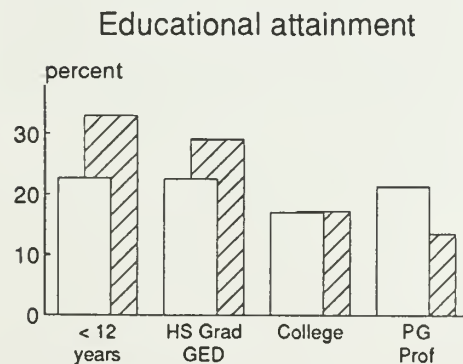
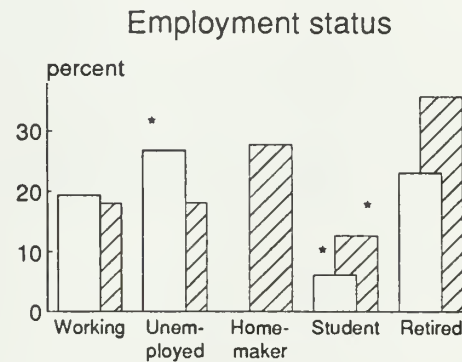
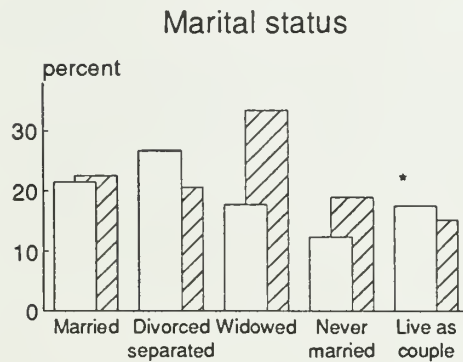
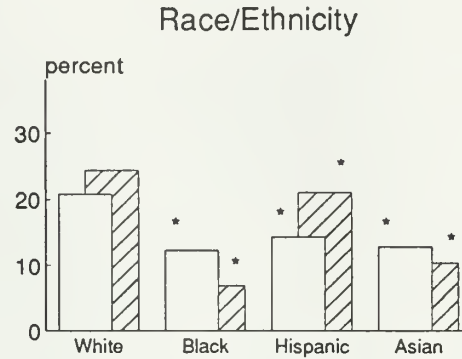
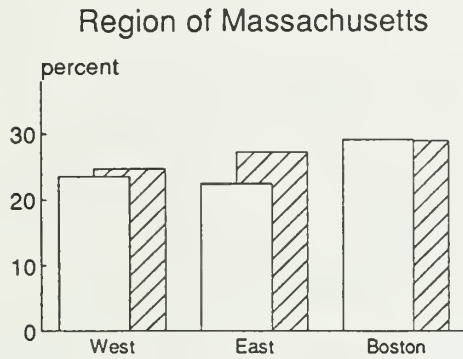
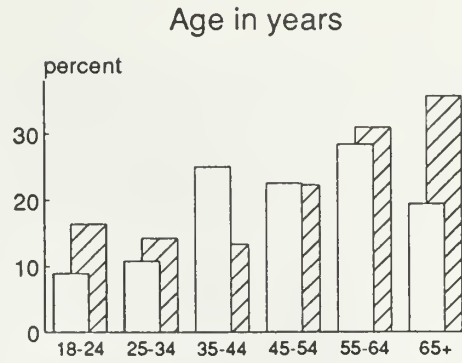
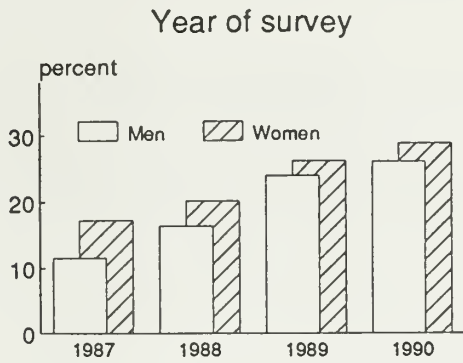
Massachusetts prevalence 22%
among those screened

Groups with low prevalence	Prevalence among screened %
Men 18-34	10
Blacks	9
Asians	12
Students	10
Women with post-graduate training	13

Groups with high prevalence	Prevalence among screened %
Women 65 +	36
Widowed women	33
Retired women	36
Women with less than high school education	33

Definition	Among those who reported ever having their blood cholesterol checked, responded affirmatively to the question "Have you ever been told by a doctor or other health professional that your blood cholesterol is high?"
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- Time trends** The overall proportion of people who had their blood cholesterol checked who had been told it was high was 22%. The proportion increased from 15% in 1987 to 27% in 1990. The trend was similar for men and women.
- Age** Trends by age were not consistent. Among men below age 35, 10% of those screened were told they had high cholesterol, whereas for men aged 35 - 64 the proportion was 25%. Among the oldest group of men the proportion was 19%. Among women below age 45, approximately 15% of those screened had high cholesterol. From age 45 there was a steep rise in the proportion told they had high cholesterol, to 36% among women aged 65 and over.
- Region** The proportion of those screened who had been told they had high cholesterol was highest in metropolitan Boston (29%), as compared to 25% elsewhere in the Commonwealth.
- Race/Ethnicity** The proportion of screened respondents who were told they had high cholesterol was highest for whites (men 21%, women 24%) and lowest for blacks (9%) and Asians (12%).
- Marital status** Screened widowed women were most likely to report having been told they had high cholesterol (33%). Screened widowed men reported a lower prevalence of high cholesterol (18%). The lowest prevalence of high cholesterol among those screened was for never-married respondents (16%) and those living as members of unmarried couples (17%).
- Employment** Screened students reported the lowest prevalence of high cholesterol (10%). Screened unemployed men (27%) and female homemakers (28%) and retirees (36%) reported elevated prevalence of high cholesterol.



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Education Among men, there was little variation in prevalence of high cholesterol by educational attainment among screened respondents. Among women, there was a consistent downward trend in prevalence with increasing education, from 33% among those with less than high school education to 13% among women with post-graduate training.

Income Higher income was associated with lower prevalence of high cholesterol among screened women (lowest income category - 29%, highest income category - 17%), but not among men.

Comment The proportion of Massachusetts residents who reported ever having their cholesterol checked has increased 50% in four years. Massachusetts has almost reached the Year 2000 target of 75% prevalence. In 1990, the median prevalence of cholesterol screening across 45 States and Territories was 62%. Massachusetts ranked seventh in the country, behind Connecticut, Florida, Maine, Maryland, New Hampshire and Rhode Island.

The time trend data suggest that the cholesterol awareness campaigns and screening programs have been increasingly effective in reaching those at higher risk of elevated serum cholesterol. Low yields in some population subgroups, such as ethnic minorities and students, suggest that among these groups only low-risk individuals are having their cholesterol levels checked. Efforts need to be increased to reach those individuals within these groups who may not be aware of their risk status. This variable cannot be compared to other participants in the BRFSS program.

Mammography

Breast cancer is the most common cancer among women and the second leading cause of cancer death. One in every ten women is likely to contract breast cancer at some stage in her lifetime. During the years 1982-88 breast cancer accounted for 27,800 cases (30% of all cancers diagnosed in women) in Massachusetts.¹

Mammography and other screening methods will not reduce the incidence of breast cancer but they do permit early detection, an important first step in treatment that increases the probability of long-term survival. The American Cancer Society recommendations for breast cancer screening include a baseline mammogram between the ages of 35 and 40 and at regular intervals (every two years until age 50, yearly from age 50) thereafter. For women at increased risk (women who have a first-degree relative who contracted premenopausal breast cancer, for example), early initial screening is recommended. To realize the potential benefits of screening mammography, timely diagnostic work-up and treatment must follow a positive screen.

Two variables are analyzed for this report, based on responses to questions asked in the BRFSS in 1987, 1989 and 1990. The first describes the proportion of women over 40 who have ever received a mammogram, while the second focuses on women aged 50 or over and describes the prevalence of screening mammography within the past 2 years. It should be noted that the Year 2000 objectives combine both screening mammography and clinical breast examination and may therefore not be truly comparable. Questions concerning prevalence of clinical breast examinations were not assessed in the BRFSS until 1990 and have not been analyzed for this report.

¹Massachusetts Department of Public Health. Cancer Incidence in Massachusetts, 1982 - 1988. Massachusetts Department of Public Health, Boston MA, 1991.

Ever had mammogram

Target population	Year 2000 objective* %	National prevalence %	Massachusetts prevalence** %
Women over 40	80	36	66
Special populations			
Hispanic women	80	20	46
Low-income women	80	22	53
Less than high school education	80	23	57
Black women	80	28	91

* Year 2000 objectives and national prevalence estimates pertain to women who have received both screening mammography and clinical breast examination. Massachusetts prevalence pertains only to screening mammography.

** Estimates for Hispanic and black women are based on sparse data.

Groups at increased risk	Prevalence* %
Hispanic	46
Widowed	56
Low income	53

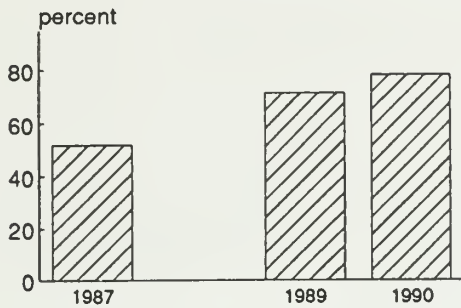
(*) Lower prevalence implies increased risk of early breast cancer remaining undetected. Estimate for Hispanic women based on sparse data.

Definition	Women 40 years of age or more who responded affirmatively to the question "Have you ever had a mammogram?"
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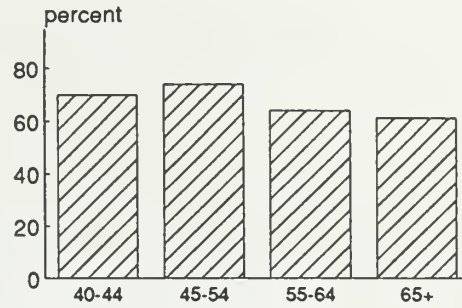
Time trends	The module was administered in 1987, 1989 and 1990. Prevalence of reported screening mammography among women age 40 and over increased from 52% in 1987 to 78% in 1990. Mean prevalence among women age 40 and over was 66%.
Age	The proportion of women reporting ever having a mammogram was highest among those age 45-54 (74%), and was over 60% for all ages. Prevalence tended to decline with increasing age.
Region	There was a gradient in favor of metropolitan Boston, although the differences between regions were small.
Race/Ethnicity	Prevalence among whites was 66%. There were insufficient non-white respondents to yield stable prevalence estimates. Among blacks, 32 of 36 women reported ever receiving mammography. For Hispanic and Asian women, the results were 12 of 24, and 10 of 16 respondents, respectively.
Marital status	The prevalence of screening mammography was highest among married (71%) and divorced or separated (66%) women, and lower among widowed (56%) and never-married (59%) women. Only five women were members of unmarried couples.
Employment	Working women reported the highest prevalence of screening mammography (72%), whereas retired women reported the lowest prevalence (60%). Unemployed women reported a prevalence of 61%, and homemakers a prevalence of 67%. There were only two students in this age range.
Education	A direct relationship between educational attainment and prevalence of mammogram was apparent (less than high school - 57%, post-graduate training - 78%).
Income	Women in the highest income category reported the highest prevalence (81%) compared to 53% prevalence among women in the lowest income category.

Ever had mammogram - women 40+

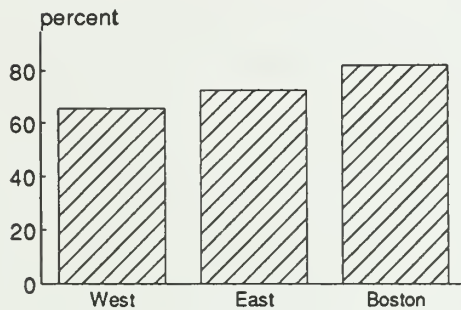
Year of survey



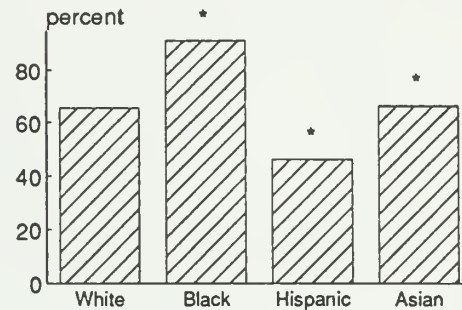
Age in years



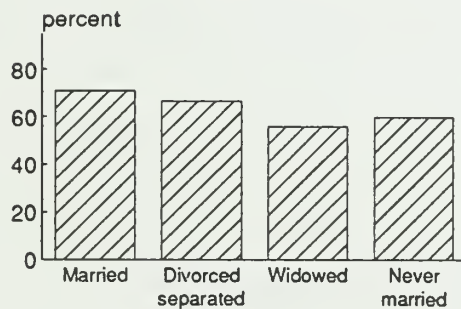
Region of Massachusetts



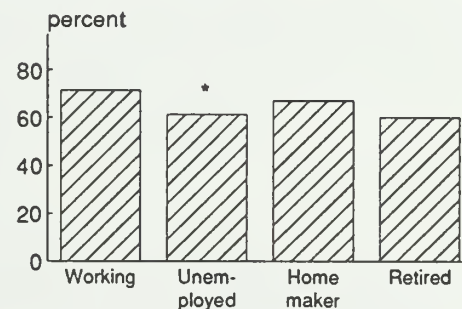
Race/Ethnicity



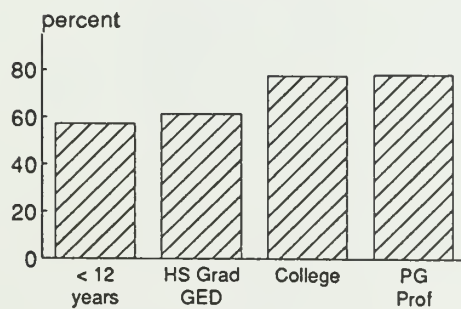
Marital status



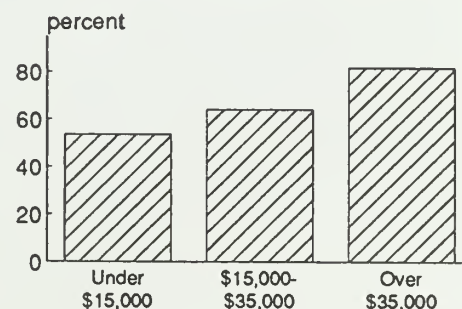
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Had mammogram in past two years

Target population	Year 2000 objective* %	National prevalence %	Massachusetts prevalence** %
Women over 50	60	25	56
Special populations			
Hispanic women	60	18	55
Low-income women	60	15	47
Less than high school education	60	16	50
Black women	60	19	81

* Year 2000 objectives and national prevalence estimates pertain to women who have received both screening mammography and clinical breast examination within the past two years. Massachusetts prevalence pertains only to screening mammography.

** Estimates for Hispanic and black women based on sparse data.

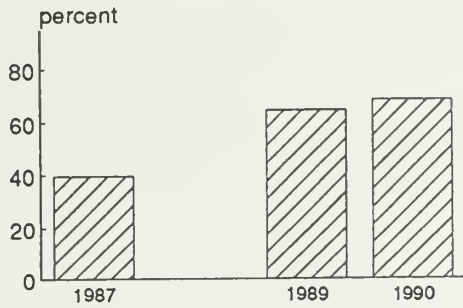
Groups at increased risk	Prevalence* %
Less than high school education	50
Low income	47
Widowed	47
Never married	49

* Lower prevalence implies increased risk of early breast cancer remaining undetected.

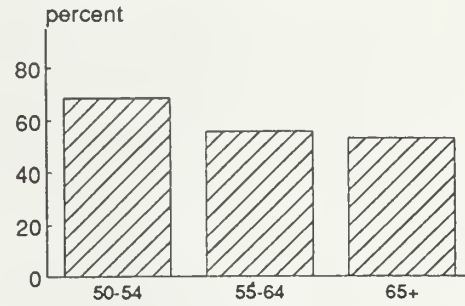
Definition	Women 50 years of age or more who responded affirmatively to the question "Have you ever had a mammogram?" and stated that their most recent mammogram was within the past two years.
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Time trends	Prevalence of reported recent mammography among women aged 50 and over increased from 50% in 1987 to 68% in 1990. Mean prevalence among women age 50 and over was 56%.
Age	The proportion of women reporting ever having a recent mammogram was highest among those aged 50-54 (69%), and was 53% or higher for all ages over 35.
Region	There was a gradient in favor of metropolitan Boston, although differences in prevalence between the regions were not marked.
Race/Ethnicity	There were not enough non-white women in this age range to yield stable estimates. Among blacks, 17 of 22 reported recent mammography. For Hispanics and Asians the results were 9 of 18 and 3 of 7, respectively. For white women, the prevalence was 56%.
Marital status	The prevalence of reported recent mammography was highest among married (61%) and divorced or separated (64%) women, and lower among widowed (47%) and never-married (49%) women. No women in this age range were members of unmarried couples.
Employment	Working women reported the highest prevalence of recent mammography (64%), whereas retired women reported the lowest prevalence (51%). Unemployed women reported a prevalence of 56%, and homemakers a prevalence of 59%. There were no women in this age range who reported their occupation as students.
Education	A direct relationship between educational attainment and prevalence of mammogram was apparent (less than high school - 50%, post-graduate training - 69%).
Income	Women in the highest income category reported the highest prevalence of recent mammography (71%) compared to 47% prevalence among women in the lowest income category.

Year of survey



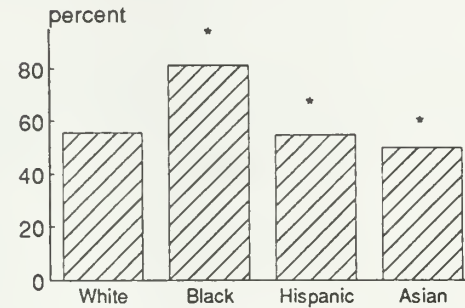
Age in years



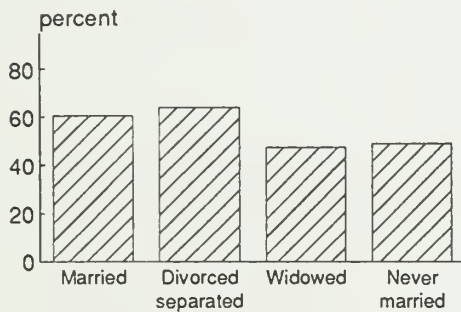
Region of Massachusetts



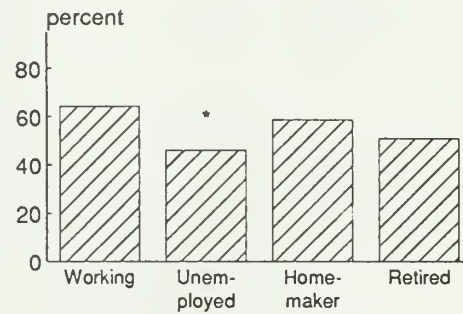
Race/Ethnicity



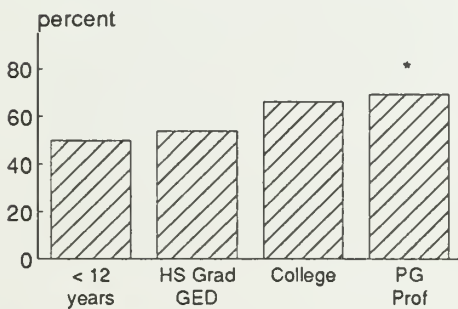
Marital status



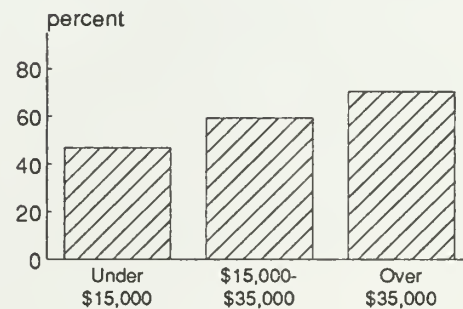
Employment status



Educational attainment



Annual household income



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Comment

A large proportion of women in Massachusetts report having received screening mammography, and this proportion has increased approximately 50% in four years. The Commonwealth is very close to attaining the Year 2000 Objective of 80% prevalence among women over the age of 40 years, and 60% of women age 50 and over, having a recent mammogram.

The findings for Massachusetts compare favorably with those reported from other states in the 1990 BRFSS. Across the 45 states and territories participating in the BRFSS in 1990, the median prevalence of women 40 and over who have ever had a mammogram was 68%. Massachusetts ranked third, behind Connecticut and New Hampshire. The median prevalence of women 50 and over who have had a recent mammogram was 58%. For this variable, Massachusetts ranked sixth overall, behind Connecticut, Maryland, New Hampshire, Rhode Island, and the District of Columbia.

Diabetes

Diabetes is the sixth leading underlying cause of death due to disease in the United States. It was the underlying cause in 37,000 deaths in 1987, and was a contributory cause to 100,000 additional deaths. Unmanaged diabetes results in renal disease, blindness and lower extremity amputations. There are two main forms of diabetes, differentiated by age of onset and dependence on insulin. The predominant form (95% of cases) is Non-Insulin Dependent Diabetes (NIDDM), which is characterized by onset at age 40 or later, and is closely associated with obesity.

Target population	Year 2000 objective %	National prevalence %	Massachusetts prevalence %
Whole population	2.5	2.8	4.6
Special populations			
Hispanics	4.9	5.5	5.5
Blacks	3.2	3.6	6.0

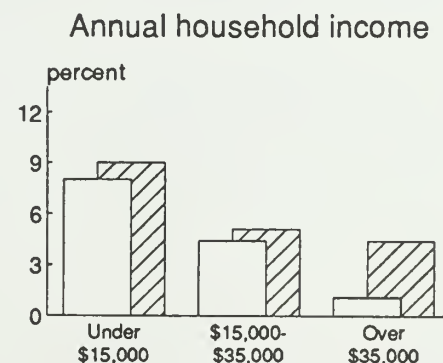
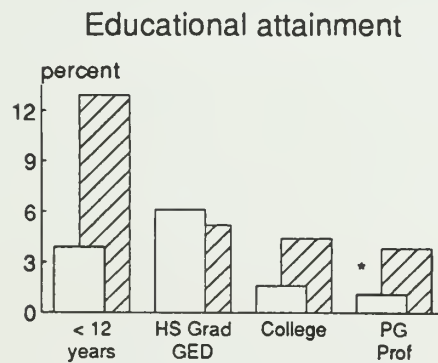
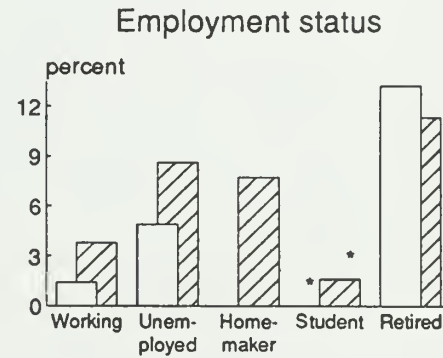
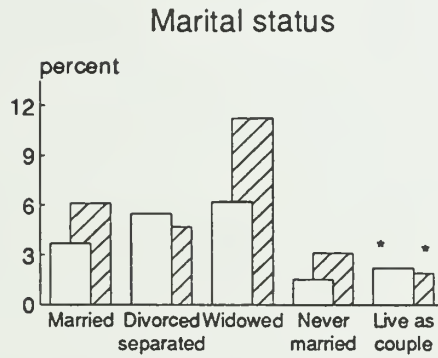
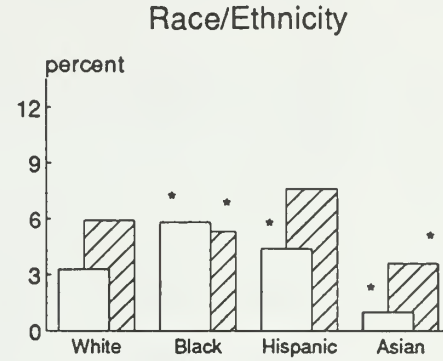
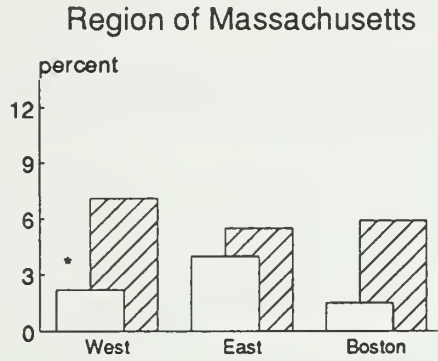
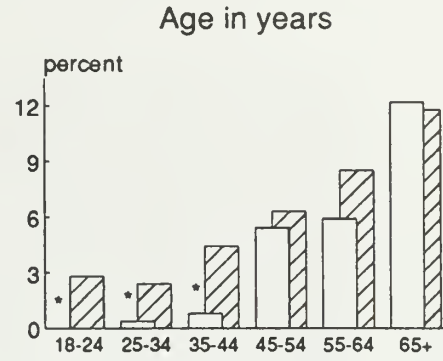
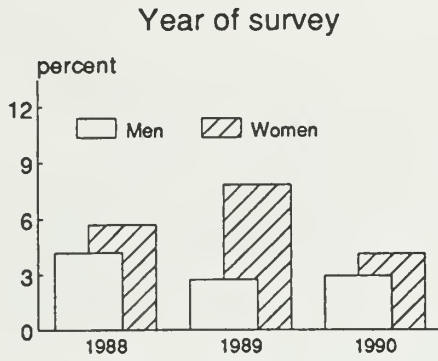
Groups at increased risk

Prevalence

	%
Age 55-64	7
Age 65+	12
Low income women	9
Women with less than high school education	13
Retired	12
Widowed	10

Definition	Responded affirmatively to the question "Have you ever been told by a doctor that you have diabetes?"
-------------------	---

Time trends	Diabetes prevalence fluctuated around 5%, and was consistently higher among women than among men. Prevalence estimates among men are based on small numbers and are therefore unstable.
Age	Among men and women prevalence was strongly associated with age, rising from 1-2% among respondents below age 35 to 13-14% among respondents over age 65.
Region	Among women there was little variation in prevalence across regions. There were too few male respondents with diabetes to derive stable estimates.
Race/Ethnicity	Five percent of white respondents reported having diabetes. There were 19 black, Hispanic and Asian respondents who reported having diabetes. It is not possible to derive stable prevalence estimates for these groups.
Marital status	Widowed women reported the highest prevalence (11%). Prevalence among never-married respondents and those living as couples was low (below 3%), a reflection of the low mean age of respondents in these groups.
Employment	Prevalence was highest among retired respondents (12%). Among working and unemployed respondents, prevalence was two-fold higher among women than among men.
Education	Women with less than high school education reported 13% prevalence of diabetes, while among men in this category prevalence was 4%. Prevalence was lowest among men with college and post-graduate training. In both these categories women reported three-four-fold prevalence. Among high school graduates, who reported a prevalence of 6%, there was no difference between men and women.
Income	Prevalence of diabetes was strongly and inversely associated with household income. Among women the prevalence declined from 9% at the lowest income level to 4% at the highest, while among men the decline was stronger, from 8% to 1%.



* Estimated prevalence for this cell based on sparse data (fewer than 50 respondents overall and/or fewer than 5 respondents with the characteristic).

Comment

As with other self-reported conditions, the validity of prevalence estimates from the BRFSS rests upon the assumption that all individuals who have diabetes are aware of their condition. Detection of diabetes is by a clinical test of sugar metabolism. Early detection allows treatment to be started prior to any irreversible pathologic changes, such as renal disease, retinopathy, loss of limb function, or coma. To the extent that groups within the population lack access to routine medical care, early detection of incident cases will be incomplete. It is crucial that testing for adult-onset, non-insulin-dependent diabetes mellitus be routine among persons over the age of 40, among whom prevalence is elevated. Non-insulin-dependent diabetes is best managed by a regimen of diet and exercise, with occasional hypoglycemic agents used for additional control.

Appendices

Table I

Administered modules, Massachusetts Behavioral Risk Factor Surveillance System, 1986-90*

Module	1986	1987	1988	1989	1990
Seat belt use	Yes	Yes	Yes	Yes	Yes
Hypertension detection and control	Yes	Yes	Yes	Yes	Yes
Exercise	Yes	Yes	Yes	Yes	Yes
Cigarette use	Yes	Yes	Yes	Yes	Yes
Smokeless tobacco use [#]	Yes	Yes	Yes	No	No
Cholesterol screening	Yes	Yes	Yes	Yes	Yes
Diabetes prevalence	No	No	Yes	Yes	Yes
Mammography	No	Yes	No	Yes	Yes
Alcohol consumption	Yes	Yes	Yes	Yes	Yes
Dietary fats [#]	No	No	No	No	Yes
HIV/AIDS knowledge [#]	No	No	Yes	Yes	Yes

* Questions within each module may not be identical across years.

Results from these modules are not presented in this report.

Table II

Disposition of dialled telephone numbers, Massachusetts BRFSS 1986-90

Final disposition		1986 N	1987 N	1988 N	1989 N	1990 N	
A.	Completed interview	1133	1439	1440	1233	1296	
B.	Selected respondent refused	509	498	295	675	708	
C.	Not a working number	449	505	424	996	2486	
D.	Ring, no answer after multiple attempts	513	486	431	861	465	
E.	Business telephone	365	362	418	421	978	
F.	No eligible subject in household	10	13	17	198	93	
G.	No eligible respondent could be reached during interview period	252	228	185	171	90	
H.	Language barrier	37	57	57	0	0	
I.	Terminated within interview	13	6	4	10	18	
J.	Line busy after multiple attempts	49	27	5	83	32	
K.	Eligible respondent identified but unable to complete interview	45	51	46	70	70	
Response - CASRO model* (%)			50	57	65	47	57
Response - Upper bound# (%)			70	74	83	64	64

* CASRO (Council of American Survey Research Organizations) model - apportions unknowns to eligible and ineligible groups in the same proportion as exists among calls of known disposition. Response rate calculated according to the formula:

$$\text{CASRO} = \frac{A}{(A+B+G+I) + \left\{ \left\{ \frac{A+B+G+I}{A+B+G+I+C+E+F+H+K} \right\} \times (D+J) \right\}}$$

Upper bound - Assumes all unknowns were in fact ineligible. Response rate calculated according to the formula:

$$\text{UPPER BOUND} = \frac{A}{(A + B + I)}$$

Table III

Procedure for generating weights for adjustment:

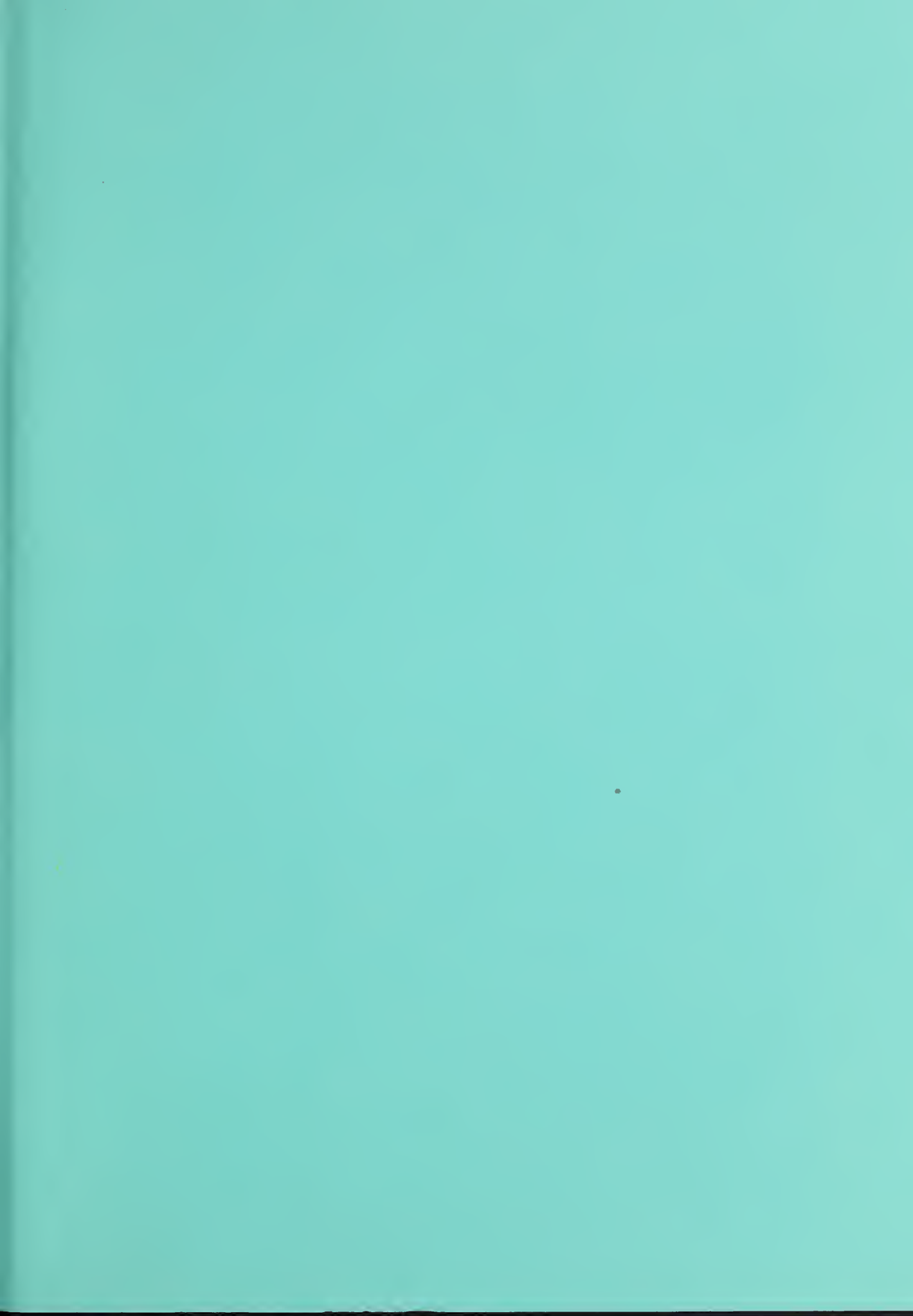
1. Compute the raw weight as the number of adults in the household divided by the number of different telephone numbers that will reach the household. (These data were obtained in the interview.)
2. Compute the cluster size adjustment as the expected cluster size divided by the actual cluster size. (These data are available from the survey organization.)
3. Compute the base weight for each subject as the raw weight times the cluster size adjustment.
4. Define cells based on age/sex/ethnicity, such that there are at least 10 subjects in each cell. (See Table IV for cells used in this analysis.) Tabulate statewide population data for each cell.
5. For each cell, compute the post-stratification weight as the state population within that cell divided by the sum of the base weights within the same cell.
6. For each subject, the final weight is calculated as the base weight for that subject times the post-stratification weight for the cell which that subject falls within.

Table IV

Sample distribution and population estimates used to generate weights for age,sex,race/ethnicity-adjusted prevalence data.

Racial/Ethnic group	Sex	Age group	Sample size	1988 Population*
White non-Hispanic	Male	18-24	261	318,754
		25-34	667	472,798
		35-44	579	384,281
		45-54	303	268,600
		55-64	272	235,644
		65 +	374	293,042
	Female	18-24	385	326,236
		25-34	862	481,076
		35-44	690	398,778
		45-54	409	284,672
		55-64	368	265,841
		65 +	768	480,076
Black non-Hispanic	Male	18-29	24	34,221
		30-44	33	32,219
		45 +	30	25,173
	Female	18-29	41	35,806
		30-44	43	34,283
		45 +	39	32,964
Hispanic	Male	18-29	28	34,536
		30-44	32	27,084
		45 +	22	16,199
	Female	18-29	49	34,676
		30-44	32	28,261
		45 +	33	19,988
Other non-Hispanic	Male	18-29	18	37,808
		30-44	18	31,933
		45 +	13	19,224
	Female	18-29	17	38,505
		30-44	18	33,125
		45 +	22	22,264

* Based on a linear interpolation of 1980 and 1990 Census data; 1990 data were not statistically adjusted for possible undercount.





**Massachusetts Department of Public Health
Bureau of Health Statistics, Research and Evaluation
150 Tremont Street
Boston, Massachusetts 02111**

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